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TECHNICAL INNOVATION AND PERFORMANCE OF MICRO SMALL AND MEDIUM ENTERPRISES IN BAYELSA STATE NIGERIA

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Abstract

The study examined the relationship between technical innovation and performance of small and medium scale enterprises (SMEs) in Bayelsa State, Nigeria. Specifically, the objectives sought to examine how the dimensions of technical innovation (product, process and market innovation) relate to SMEs performance. The research design adopted in this study was survey research approach and the sample size for the study consists of 218 registered small and medium scale enterprises (SMEs). However, stratified sampling procedure was used to select these SMEs from the target population to participate in the study and the collected data was analyzed using multiple regression. The result of the bivariate relationship revealed that product innovation is a strong predictor of MSMEs performance in Bayelsa State. This significant correlation stems from the fact that product innovation gives credence to customer satisfaction, increased market share, higher sales, and improved competitiveness among SMEs in Bayelsa State. Furthermore, process innovation was found to negatively correlate SMEs performance in Bayelsa State. Though, negative but the correlation was significant thus, implies that implementing cutting edge technologies alone can actually undermine sales performance, possibly due to high setup of SMEs in Bayelsa State. The paper concluded that technical innovation is a predictor of performance. It recommended that SMEs should conduct a thorough cost-benefit analysis before investing in technical innovation as it will generate better and viable inducement for innovation activities on in their firms.

Keywords:

Market innovation, performance, process innovation, product innovation, sme.

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INTRODUCTION

The prevalence of a knowledge-based economy and globalized industries/markets is driving the developments and increase in technical innovative products and services. Since the early 1980s, the holistic development of the highly technically driven knowledge economy and globalization triggered international competition has increased the relevance of technical innovation in both developing and developed economies. This justifies why some regional and national economies are more advanced and developed than others it lies squarely on their systematic and successful deployment of technical innovation frameworks and structures (Okonkwo et al., 2023).

Affirming this view, the World Bank (2015) states that technical innovation and innovative Information and Communication Technology (ICT) products in organizations have already impacted economic performance among firms in developing countries, where technical innovation contributes positively to firm growth and development. Micro, Small, and Medium-scale Enterprises (MSMEs) play a crucial role in driving economic growth, employment generation, and poverty reduction in Nigeria (Ali, 2021). MSMEs encompass diverse sectors, including manufacturing, services, agriculture, and trade. Despite their relatively small size and limited resources compared to large corporations, they exhibit remarkable flexibility and adaptability in response to market dynamics (FGN, 2021).

Estimations from international organizations show that MSMEs account for between 80% to 99% of firms in any given country, 60% to 70% of global employment (World Trade Organisation, 2016), and approximately 50% of GDP (SME Competitiveness Outlook, 2015) in both formal and informal sectors. This justifies why nations worldwide pay more attention to MSME performance. A study by Martin and Namusonge (2014) provides empirical evidence that 99.7% of business ventures globally are MSMEs. The implication is that improving the efficiency and effectiveness of these MSMEs will stimulate economic growth through job creation and value addition to the gross domestic product. MSMEs account for a large portion of various nations' economies, contributing up to 40% of national income (GDP) in emerging economies (World Bank, 2022). In Nigeria, Micro Enterprises (ME) accounted for 96.9% of businesses, while SMEs accounted for 3.1% of the total number of businesses as of 2020. In terms of ownership structure, 96.2% of MSMEs are sole proprietorships, 3.3% are partnerships, 0.1% are faith-based organizations, and 0.4% fall under other categories.

According to Rafiki (2020), a country’s economic growth depends largely on its MSMEs. Thus, MSMEs play a pivotal role in promoting economic growth, particularly in developing countries. The dynamic nature of the business environment demands frequent adaptations. Therefore, rigorous adoption of technical innovation by MSMEs remains a key strategy for sustaining competitiveness in international business standards. For any business to thrive amid constant environmental changes, technical innovation must be at the forefront of survival strategies (Dewoye, Salau & Adesokan, 2023). In Nigeria, MSMEs are the most common form of business, accounting for over 96% of all registered businesses and contributing nearly 50% of the national GDP prior to recent declines (SMEDAN, 2021).

However, despite various government programs and policy interventions aimed at supporting the SME sector (Pulka et al., 2021; Ayyagari et al., 2011), the sector continues to underperform (Taiwo et al., 2022), as evidenced by its 3.5% decline in contribution to Nigeria's 2020 GDP (SMEDAN, 2021).

One major reason for this decline is the persistent lack of creativity and innovation in managing SMEs (Awoleye et al., 2019; Mamman & Isaac, 2020; OECD, 2017). Many MSMEs in Nigeria, particularly in Bayelsa State, struggle with operational inefficiencies, poor market penetration, and weak financial management, largely due to their inability to adopt and integrate modern technical innovations into their business models (Gault, 2018). This lack of innovation affects their capacity to design, develop, and market products competitively while efficiently managing operations with the necessary technical facilities (Damanpour& Aravind, 2012). The situation is further exacerbated by cash flow management challenges, which have contributed to declining performance, particularly during the COVID-19 era, where businesses relied heavily on ICT for survival (Matthew & Micah, 2023; Kraus et al., 2020). The pandemic exposed the vulnerabilities of MSMEs that lacked digital transformation strategies, leading to reduced productivity, supply chain disruptions, and, in some cases, business closures (Gupta et al., 2020). A PricewaterhouseCoopers Nigeria (PwC) survey report indicates a drop in MSME performance from 2.2% in 2019 to 3.4% in 2020, reflecting the adverse impact of the pandemic on the sector (PwC, 2021). Another study revealed that about 90% of SMEs in Nigeria are not performing well, particularly post-COVID-19, due to structural weaknesses, including poor adoption of innovative business strategies (Oyelaran-Oyeyinka& Lal, 2020).

Given these challenges, there is an urgent need to examine how Nigerian MSMEs, especially in Bayelsa State, utilize technical innovation strategies such as product innovation, process innovation, organizational innovation, and marketing innovation to improve efficiency and effectiveness (Matthew & Micah, 2023; Tidd & Bessant, 2018). The ability of MSMEs to innovate in these key areas determines their competitiveness, sustainability, and capacity to adapt to changing market dynamics (Porter, 1990; Chesbrough, 2010). However, the situation in Bayelsa State is particularly concerning, as most MSMEs lag behind their counterparts in more economically vibrant states like Lagos, Enugu, Port Harcourt, and Abia, primarily due to a lack of technical innovation adoption (Adegbite & Ilori, 2018). Thus, for businesses to grow in Bayelsa State, MSMEs must take the lead by embracing innovations that yield desired profitability. The reason is because the business environment is becoming more competitive, dynamic, and flexible, with many businesses closing due to a lack of innovation, especially in this technically driven economy. Although, Bayelsa State has great potential for MSMEs to perform effectively if they embrace technical innovations. Therefore, this study seeks to examine technical innovation and the performance of small and medium-scale enterprises (MSMEs) in Bayelsa State, Nigeria, with a focus on efficiency and effectiveness as key performance measures.

LITERATURE REVIEW

Technical Innovation

Innovation within small and medium-sized enterprises (SMEs) involves the development of fresh or greatly improved products, processes, marketing techniques, or organizational methods in business operations (Rena, 2023). This definition underscores the dynamic nature of innovation, which is not merely about novelty for its own sake but about meaningful improvements that drive business success. SMEs, due to their size and agility, are uniquely positioned to leverage innovation as a competitive advantage, often outpacing larger corporations in adaptability and responsiveness to market shifts (OECD, 2019). The ability to innovate allows these enterprises to carve out niches, differentiate themselves from competitors, and respond effectively to evolving consumer demands.

According to Aires et al. (2022), innovation is closely connected to the concept of renewal, notable enhancements, and reconfigurations in physical, relational, or virtual aspects. This perspective highlights that innovation is not restricted to technological advancements alone but extends to all facets of business operations. Renewal, in this context, refers to the continuous improvement and revitalization of business models, ensuring that SMEs remain relevant in rapidly changing markets (Tidd & Bessant, 2018). Enhancements may involve incremental changes that refine existing processes, while reconfigurations suggest more radical shifts in how businesses operate, interact with stakeholders, or deliver value. The physical dimension of innovation includes tangible changes such as new machinery, product redesigns, or workspace optimizations (Damanpour, 2017). The relational aspect emphasizes improvements in customer engagement, supplier relationships, and internal collaboration (Chesbrough, 2020). Meanwhile, the virtual dimension encompasses digital transformations, including the adoption of cloud computing, artificial intelligence, and data analytics to streamline operations (Nambisan et al., 2019). However, innovations can take various forms, including product innovation, which introduces new or improved products or services to the market (Ramadani et al., 2019).

Process Innovation

Product innovation is perhaps the most visible form of innovation, as it directly impacts consumers and can significantly alter market dynamics (Utterback & Abernathy, 1975). For SMEs, this could mean developing a new line of eco-friendly products in response to growing environmental consciousness or enhancing existing offerings with additional features that improve usability or functionality (Porter & Kramer, 2011).

Process Innovation

Process innovation, another critical dimension, focuses on streamlining internal processes and workflows (Schallmo et al., 2018). While less visible to external stakeholders, process innovation is vital for operational efficiency, cost reduction, and scalability (Teece, 2010). SMEs often face resource constraints, making it imperative to optimize production, logistics, and administrative procedures (Womack & Jones, 2003). For instance, adopting lean manufacturing techniques can minimize waste and reduce production lead times, while

automation tools can handle repetitive tasks, freeing up human resources for more strategic activities (Brynjolfsson & McAfee, 2014).

Market Innovation

Marketing innovation aims to implement new strategies to effectively reach and engage customers (Adamu et al., 2020). In an era of digital transformation, traditional marketing approaches are increasingly being supplemented—or even replaced—by data-driven, personalized campaigns (Kotler et al., 2017). SMEs can leverage social media platforms, influencer partnerships, and content marketing to build brand awareness and foster customer loyalty (Kaplan & Haenlein, 2010). For example, a local fashion retailer might use Instagram's shopping features to create a seamless online purchasing experience, while a boutique coffee shop could employ geo-targeted ads to attract nearby customers (Chaffey & Ellis-Chadwick, 2019).

Performance of MSMEs

The performance of small and medium-sized businesses (SMEs) is a multifaceted and dynamic concept that encompasses not only financial outcomes but also broader operational, strategic, and human elements that contribute to their overall success and sustainability (Kaplan & Norton, 1996; Venkatraman & Ramanujam, 1986). At its core, performance refers to the efficiency, effectiveness, and ability of SMEs to meet their defined business objectives, whether they pertain to market penetration, revenue generation, customer satisfaction, or long-term growth (Richard et al., 2009). The measurement of performance is not confined to a singular dimension but rather integrates both quantitative and qualitative indicators, reflecting the complex interplay between financial health, operational excellence, and stakeholder engagement (Neely et al., 2005).

Financial metrics have traditionally been the cornerstone of performance evaluation, providing objective and quantifiable data that reflects the economic viability of a business (Barney, 1991). Key indicators such as profit margins, revenue growth, return on investment (ROI), and market share serve as critical benchmarks for assessing how well an SME is meeting its fiscal targets (Brush &Vanderwerf, 1992). These metrics offer a tangible means of comparison, both within the industry and across different time periods, allowing business owners and stakeholders to gauge progress and identify areas requiring improvement (Hansen & Wernerfelt, 1989). However, while financial performance is undeniably crucial, it represents only one facet of a much broader spectrum. Subjective measures, including customer satisfaction, employee morale, managerial effectiveness, and brand reputation, play an equally significant role in shaping the overall performance narrative (Powell, 1995). These softer indicators, though less easily quantifiable, provide invaluable insights into the operational health and long-term sustainability of an SME (Barney & Hesterly, 2019).

Methodology

The research design adopted in this study is survey research approach which avail the researcher an opportunity to systematically ask several individuals the same question(s)

through questionnaire. The reason for adopting this strategy is to enable the researcher obtains direct information that describes the characteristics of the target population in relation to phenomenon under investigation. The target population of the study is Four Hundred and Eighty (480) registered small and medium-sized enterprises (SMEs) from which a sample size of Two Hundred and Eighteen (218) was obtained using Taro Yamane's formula. Stratified sampling technique was utilized during questionnaire distribution and the collected data were analyzed using Regression analysis statistical tool.

Results

Demographic Profile

Variable	Categorization	Frequency	Percentage (%)
Gender distribution	Male Managers	123	64.4
	Female Managers	68	35.6
Age Bracket	18-35 years	31	16.2
	36-49 years	115	60.2
	50 and above years	45	23.6
Educational Qualification	M.Sc and above	26	13.6
	B.Sc and its equivalent	84	44.0
	OND and its equivalent	45	23.6
	SSCE/WAEC	31	16.2
	FSLCE	5	2.6
Working Experience	1-10 years	44	23.0
	11-20 years	96	50.3
	21 years and above	51	26.7

Source: Field Data, 2025

As depicted in the table above, the study shows that one hundred and twenty three (123) respondents are male managers which represent 64.4% of the total respondents, while sixty eight of the respondents are female managers, which represents 35.6% of the total respondents. From the pie chart in figure 4.1 shows that SMEs owners in Bayelsa State are predominantly males. It is obvious that 16.2% of the respondents have attained the age of 18-35 years, 60.2% falls within the age bracket of 36-49 years, and 23.6% falls between 50 years and above. Thus, from the pie chart, it is clearly demonstrated that most of the respondents falls between the age bracket of 36-49 years. This shows that the youth population dominates those performing in SMES in Bayelsa State. The reason is that they are more technologically oriented and pre-occupied in the management of businesses. The responses on educational qualification indicates that 13.6% of the total respondents had Masters' Degree and above, 44% had B.Sc. Degree and its equivalent, 23.6% had OND and its equivalent while 16.2% had SSCE/WAEC. However, the pie chart demonstrated that most of the respondents had B.Sc and its equivalent Degree which implies that most of the SMEs operators in Bayelsa State are university graduates but surprisingly OND and its equivalent degree holders also constitute second majority of the population that operate SMEs as well. Furthermore, it was revealed that 23% of the total respondents had working experience between 1-10 years in

SMEs operation, 50.3% had 11-20 years experience of operation and 26.7% had 21 years and above experience. The pie chart shows that majority of the respondents are into SMEs operation between 11-20 years. This depicts that SMEs owners in Bayelsa State have adequate knowledge on the workings of the business.

Bivariate Test of Hypotheses

The hypothetical propositions were subjected to statistical tests using Multiple Regression statistical tool with the application of SPSS software. The statistical tool measures the extent of relationship between the dimensions of technical innovation (product, process and market innovations) and performance of SMEs in Bayelsa State and the result presented below:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.835[a]	.698	.693	.34547

a. Predictors: (Constant), Market Innovation, Product Innovation, Process Innovation.

The multiple dimensions of technical innovation (Market Innovation, Product Innovation and Process Innovation) revealed the nature of influence on the performance of SMEs in Bayelsa state where (R = .835) indicating a favourable level of prediction which is 84%.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.493	3	17.164	143.812	.000[b]
	Residual	22.319	187	.119		
	Total	73.812	190			

a. Dependent Variable: Performance

b. Predictors: (Constant), Market Innovation, Product Innovation, Process Innovation

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.524	.439		5.747	.000
	Product Innovation	.440	.048	.497	9.154	.000
	Process Innovation	-.068	.051	-.106	-1.320	.188

	Market Innovation	-.370	.067	-.504	-5.531	.000

a. Dependent Variable: Performance

The multiple regression predict the performance of MSMEs via the dimensions of technical innovation which indicates that all three constructs actually predict the variance in the performance of MSMEs at 95% confidence level given product innovation (t = 9.154); process innovation (t = -1.320) and market innovation (t = -5.531) respectively. The outcome revealed that technical innovation dimensions added together statistically predict performance of MSMEs in Bayelsa State f(3; 187) = 143.812, p =.000 < 0.05 and R^2 = .698. Although, process innovation and market innovation had negative but significant correlations with performance of MSMEs as seen in the result. The coefficient of determination (R^2 = .698) explains that 70% of MSMEs performance in Bayelsa State can be explained by technical innovation (product, process and market innovations) while the remaining 30% cannot be accounted for by the dimensions of technical innovation hence, considered error term.

Discussions

The result of the bivariate relationship revealed that product innovation is a strong predictor of MSMEs performance in Bayelsa State. Product innovation, involving the development and introduction of new or significantly improved goods and services, has been identified as a critical driver of MSME performance. This corroborate Oduro (2019) who in a Ghanaian study, found that product innovation positively correlates with enhanced customer satisfaction, increased market share, higher sales, and improved competitiveness among SMEs. Similarly, Osei, et al., (2016) in another Ghanaian investigation in the manufacturing sector revealed that SMEs engaging in product innovation often experience higher sales growth and improved market share. These findings underscore the importance of aligning product development with customer needs to achieve superior performance outcomes.

It was also found that process innovation had negative but significant relationship with performance of MSMEs in Bayelsa State. This result contradicts the findings of Widya-Hasuti, et al., (2018) who provided empirical evidence from Indonesia environment indicating that process innovation serves as a crucial intermediary between firm-specific capabilities and sustainable innovation, thereby positively impacting performance. Also, Oduro (2019) reported that in Ghana, process innovation contributes to faster time-to-market and heightened competitiveness among SMEs. These studies highlight how process innovation can lead to increased efficiency and cost reduction which are essential elements for MSMEs striving for growth and sustainability. Nevertheless, the outcome of this study suggests that implementing cutting edge technologies alone can actually undermine sales performance, possibly due to high setup of MSMEs in Bayelsa State. This however, proved that learning outweighing shortterm returns and disruption during the adoption of disrupting production pipelines and misalignment with market needs before the benefits manifest. This illustrates that process innovation, when pursued in isolation or in an inflexible organizational

context like the ones in Bayelsa State can be counter-productive. This is somewhat surprising because process innovation which entails the implementation of new or significantly improved production or delivery method plays vital role in enhancing MSME performance.

Market innovation is found to have negative but significant relationship with performance of MSMEs in Bayelsa State. This surprise finding could be that MSMEs in Bayelsa State might be facing challenges like lack of skilled employees, insufficient market information, lack of interest in innovation and limited infrastructure and resources. This agrees with Sedibe (2020) who highlights that resource limitations faced by small and medium-sized enterprises (SMEs), such as restricted finances and insufficient infrastructure can impede organization's ability to invest and execute marketing innovation effectively. This proved that market innovation can sometime harm MSMEs performance despite promising enhanced visibility and market share. However, Nham, et al., (2016) study in Vietnam contradicts this finding by demonstrating that marketing innovation positively influences firm performance thereby emphasizing the role of innovative marketing practices in expanding market reach and improving customer engagement.

Furthermore, Jeong and Chung (2023) findings noted that through the use of innovative marketing strategies like social media marketing, personalized advertising, and interactive customer experiences facilitated by information and communication technologies (ICTs), SMEs can engage with their target audience more efficiently build solid customer relationships, and ultimately drive sales growth and profitability. The similarities in the latter findings could be due to the fact that when SMES uses technological tools in their production process, software to design and develop their product, technological tools to improve on their support services and technological means to deliver the products to its customers, they could stand to led improve profitability. Nevertheless, market innovation can backfire if it leads to uncoordinated or non-differentiated marketing efforts, therefore, MSMEs in Bayelsa State should approach innovation strategically by ensuring adequate organizational support and absorption capacity thereby aligning their innovation with customer strategy.

Conclusions and recommendation

On the basis of the findings, the study is made to conclude that SMEs are known to account for a substantial share of every country's economy hence; the relative importance of this segment needs an examination towards their enterprise performance. The fact that SMEs performance strongly relies on technological innovation, SMEs in Bayelsa State still need to consistently engage in product innovation that could invoke the development of new and improve goods and services. This would not only enhance performance but will engender customer satisfaction, increased market share, improve competitiveness and higher sales growth. Furthermore, SMEs in Bayelsa State should be aware that implementing cutting edge technologies alone can actually underscore sales performance, possibly due to high setup therefore, they should endeavour to implementation new processes during production. This is because pursuing innovation in isolation or in an unbendable organizational context like the ones in the State can be counter-productive despite its efficiency and cost reduction.

Despite facing challenges like the general lack of skilled employees, insufficient market information, lack of interest in innovation and limited infrastructure and resources; SMEs in Bayelsa State should be aware that technological innovations like market innovation can backfire if it leads to uncoordinated or non-differentiated marketing efforts therefore, they should approach these innovations strategically by ensuring adequate organizational support that would align with customer strategy. These approaches will enable them to engage with their target audience more efficiently and build strong customer relationships. On the basis of these observations, the study concluded that technical innovation contribute significantly to SMEs performance, competitiveness, efficiency and market adaptability especially when complemented with organizational learning, creativity and effective leadership. Given that the business environment in Bayelsa State is continually changing, technological innovation becomes a competitive advantage when it is based on the understanding of customers' needs to guarantee high quality of life to the people thus, SMEs need to consciously take step to mitigate these hindrances in order to boast their performance market index. Thus, the study makes the following recommendations:

i. SMEs should ensure that changes in the innovation must be addressed proactively through creative thinking and innovative behavior by finding new ideas, and implementing same effectively and efficiently on the product.

ii. SMEs should conduct a thorough cost-benefit analysis before investing in process innovation and they should also focus on improving the process as it generate better and viable inducement for innovation activities on product differentiation among their firms.

iii. SMEs managers should learn to align marketing innovations with finely tuned customer insights and always test new strategies before scaling, especially in this high dynamic business environment.

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