Covenant Journal of Entrepreneurship (CJoE) Vol. 8 No.1, June 2024
ISSN: *p. 2682-5295 e. 2682-5309* DOI: xxxxxxxxxxxxxxxxxxx

An Open Access Journal Available Online

Demystifying the Role of Technological Entrepreneurship on the Performance of Medium-Scale Enterprises (MSEs)

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Received: 19.5.2023 Accepted: 7.7.2023
Date of Publication: May 2024

Abstract
This study delves into the impact of technological entrepreneurship on Micro and Small Enterprises (MSEs) in Lagos, Nigeria, shedding light on how integrating technological entrepreneurship into business operations can unlock opportunities for improved product or service quality, sales growth, and profitability. Conversely, it reveals that non-technological entrepreneurial activities may hinder MSEs' entrepreneurship and productivity. Employing a mixed research approach, combining primary and secondary data, the study employs descriptive and inferential statistics, including panel regression analysis and correlation coefficients, to assess the implementation of technological entrepreneurship and its effect on business performance. Notable findings pinpoint factors influencing technological entrepreneurship implementation, such as Business Size, Perceived Ease of Use, Cost of Technology Deployment, Perceived Benefit, Market Dynamism, and Business Environment, all significantly impacting business performance. Identified obstacles to technological entrepreneurship implementation include Inconsistency in Government Policy, Lack of Proper IT Proficiency, Fear of Data Insecurity, High Cost of Technology Deployment, and Legacy Culture Thinking. The study concludes that technological entrepreneurship significantly propels MSEs' performance in Lagos and urges entrepreneurs to bolster their technological capacity for heightened productivity. Moreover, it underscores the social implications, such as the potential for job creation, economic growth, and heightened competitiveness within the MSE sector, emphasizing the pivotal role of entrepreneurs in advancing both business performance and broader societal development.

Keywords: Business performance**,** Medium-Scale Enterprises (MSEs), Technological Entrepreneurship

1. Introduction

Technological entrepreneurship's impact on Medium-Scale Enterprises (MSEs) performance is a multifaceted subject with global ramifications. Globally, SMEs significantly contribute to employment, accounting for two-thirds of all jobs. In developing nations like Morocco, 93% of industrial firms are SMEs, contributing substantially to production, investment, and exports. South Africa observes a notable 91% of formal business entities as SMEs, contributing 52–57% to the GDP. Nigeria's SMEs have played a substantial role, contributing nearly 48% of the national GDP between 2005 and 2010 and a significant share in industrial jobs and manufacturing (NBS, 2010). Surveys conducted by the NBS and the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) emphasize the strategic positioning of the SME sector to absorb jobs, enhance per capita income, increase value addition, and spur economic expansion and GDP growth (SMEDAN, 2013). Despite their crucial role, Nigeria's growth in SMEs has been relatively slow (Mohammed, 2012). Egwakhe, Akoma, Egbuta, and Akinlabi (2021) observed challenges in Nigerian SMEs' economic prosperity and survival, citing turbulent hiccups in sales due to economic constraints and setbacks in technology or innovation.

Aderemi et al. (2008) note that in southwestern Nigeria, the choice and performance of women entrepreneurs in both technological and non-technological enterprises underscore the importance of understanding how technology influences business outcomes. Similarly, in Nigeria's banking sector, Aigboduwa and Oisamoje (2013) conducted a comparative study revealing nuances in customer satisfaction between conventional and Islamic banks, showcasing the role of technology in shaping customer experience and operational efficiency. Moreover, Akande (2015) investigated the influence of information technology on the operational efficiency of Small and Medium Businesses (SMBs) in Nigeria, shedding light on the pivotal role of technology in entrepreneurial operations.

In Lagos, Nigeria, Akande and Oladejo (2013) evaluated the impact of technological entrepreneurship development programs on selected SMEs, underscoring the significance of such initiatives in enhancing business performance. Additionally, Akinwale et al. (2017) explored the challenges and prospects of e-commerce adoption by SMEs in Nigeria, highlighting the critical role of technology in expanding market reach and competitiveness. Furthermore, Akinyele et al. (2023) emphasized the importance of appropriate entrepreneurial technology usage in enhancing the performance of SMEs in Ogun State, Nigeria, indicating the pressing need for technological integration in entrepreneurial endeavors.

The prevailing issues surrounding technological entrepreneurship and MSEs extend beyond Nigeria's borders. Bailetti (2012) provides a comprehensive overview of technology entrepreneurship, emphasizing its distinctive aspects and relevance in fostering innovation-driven enterprises globally. In Norway, Clausen (2006) investigates students' entrepreneurial attitudes, reflecting the global interest in fostering an entrepreneurial mindset enhanced by technological proficiency. Moreover, Nikraftar et al. (2022) explore the factors influencing technological entrepreneurship in the nanotechnology business, highlighting the global significance of technology-driven ventures across diverse sectors.

Challenges necessitating the study of technological entrepreneurship and MSEs are evident in various contexts. In Nigeria, the need to enhance SMEs' technological innovation capabilities to improve performance is underscored by studies such as Okpalaoka et al. (2022) and Olasanmi and Ojubanire (2020), reflecting the imperative of leveraging technology for sustainable business growth. Additionally, Osita-Ejikeme and Onuoha (2021) highlight technological advancements' role in shaping SMEs' entrepreneurial orientation in Rivers State, Nigeria, amidst evolving market dynamics. Furthermore, the global imperative to understand the mediating role of corporate entrepreneurship in SMEs' performance, as studied by Rehman et al. (2018), underscores the significance of technological innovation in driving business success. Specifically, technological entrepreneurship and MSEs represent a critical domain with profound implications for business performance and economic development globally.

1.1 Statement of the Problem

The role of technological entrepreneurship in enhancing the performance of Medium-Scale Enterprises (MSEs) is a critical area of study, particularly in the context of emerging economies like Nigeria. Despite the acknowledged significance of MSEs in driving economic growth and employment generation, challenges persist in leveraging technology effectively to bolster their performance. For instance, Aderemi et al. (2008) highlight the need for MSEs, particularly in southwestern Nigeria, to adopt and effectively utilize technological innovations to remain

competitive. However, limited access to capital and technical expertise often hinder MSEs from investing in advanced technologies, impeding their ability to optimize operational efficiency and market competitiveness (Dandago & Rufai, 2014).

Moreover, the prevailing issues surrounding the role of technological entrepreneurship in MSE performance extend beyond resource constraints. In Nigeria's dynamic business landscape, factors such as inadequate infrastructure, including unreliable power supply and deficient internet connectivity, pose significant challenges to SMEs seeking to embrace technology-driven solutions (Akande & Oladejo, 2013). Furthermore, the lack of a conducive regulatory environment and limited government support for technological innovation exacerbate MSEs' difficulties in adopting and integrating innovative technologies into their operations (Okpalaoka et al., 2022). These challenges are not unique to Nigeria; similar issues have been observed in other developing countries where MSEs struggle to harness the full potential of technology to improve productivity and competitiveness (Singh et al., 2017). Thus, understanding and addressing these prevailing issues are imperative for unlocking the transformative power of technological entrepreneurship in enhancing MSE performance.

1.2 Research Objectives

The main objective of this study is to examine technological entrepreneurship's effect on medium-scale enterprises (MSEs) business performance. The specific objectives include:

i. Identify and evaluate factors influencing technological entrepreneurship implementation among selected MSEs in Lagos State.
ii. examine the relationship between technological entrepreneurship implementation and the business performance of Medium-Scale Enterprises.

1.3 Research Hypotheses

Based on the above-mentioned objectives, two main hypotheses were formulated in null form:

i. ***H01****:* There is no significant difference in factors influencing the implementation of technological entrepreneurship by Medium-Scale Enterprises in the Food Processing and Beverages sector.

ii. ***H02****:* There is no significant relationship between technological entrepreneurship implementation and the business performance of Medium-Scale Enterprises.

2. Literature Review

2.1 Technological Entrepreneurship

Technological entrepreneurship can be defined as the strategic utilization of tools, methodologies, and scientific knowledge within entrepreneurial ventures to create innovative products or processes and enhance existing ones, thereby driving value creation and fostering economic growth (Bailetti, 2012). This concept underscores the dynamic interplay between technology and entrepreneurship, where entrepreneurs leverage technological advancements to identify and exploit commercial opportunities (Shane & Venkataraman, 2003). For example, in the banking industry, Aigboduwa and Oisamoje (2013) conducted a comparative study of conventional and Islamic banks in Nigeria, highlighting how technology adoption influences customer satisfaction and business performance.

Furthermore, technological entrepreneurship involves assembling specialized individuals and heterogeneous assets to facilitate collaborative exploration and experimentation to achieve competitive advantage (Dorf & Byers, 2005). This collaborative approach is exemplified in studies such as Akande and Oladejo (2013), which appraised technological entrepreneurship development programs' impact on the performance of selected SMEs in Lagos, Nigeria. Additionally, technological entrepreneurship entails navigating risks and managing rapid growth through principled decision-making and resource mobilization (Dorf & Byers, 2005). This is evident in the research by Tuffour et al. (2018), which explores the innovative performance of small and medium-scale enterprises, highlighting the role of technological entrepreneurship in driving sustainable business growth and development. Thus, technological entrepreneurship emerges as a multifaceted phenomenon encompassing innovation, strategic leadership, and collaborative endeavors to harness the transformative potential of technology in entrepreneurial ventures.

2.2 Technological Entrepreneurship Development in Nigeria

Technological entrepreneurship development is pivotal in the growth and sustainability of Small and Medium Enterprises (SMEs) in Nigeria. These enterprises often face numerous challenges, including limited access to capital, inadequate infrastructure, and a lack of technical expertise, hindering their ability to leverage technology effectively (Egwakhe et al., 2021). However, initiatives aimed at fostering technological entrepreneurship have emerged to address these challenges. For instance, Akande and

Oladejo (2013) evaluated the impact of technological entrepreneurship development programs on selected SMEs in Lagos, Nigeria. Their study revealed that such programs can enhance SMEs' technological capabilities, thereby improving their competitiveness and performance in the market.

Moreover, the adoption of e-commerce by SMEs in Nigeria illustrates the transformative potential of technological entrepreneurship. Akinwale et al. (2017) explored the challenges and prospects of e-commerce adoption by SMEs, highlighting the role of technology in expanding market reach and increasing business opportunities. By embracing e-commerce platforms, SMEs can overcome geographical limitations and access a broader customer base, driving sales growth and enhancing profitability. This exemplifies how technological entrepreneurship enables SMEs to harness digital tools to innovate and adapt to market trends.

Furthermore, the integration of technological innovation capabilities has been shown to impact the performance of manufacturing SMEs in Nigeria positively. Okpalaoka et al. (2022) investigated the effect of technological innovation capabilities on the performance of selected manufacturing SMEs in Lagos State. Their findings underscored the importance of technological entrepreneurship in driving business success, as SMEs with enhanced innovation capabilities demonstrated higher levels of performance and competitiveness. Thus, technological entrepreneurship development initiatives are crucial in empowering SMEs to embrace innovation, overcome challenges, and achieve sustainable growth in Nigeria's dynamic business environment.

2.3 Performance of MSEs

Medium-scale enterprises (MSEs) represent a vital segment of the business landscape, contributing significantly to economic development and job creation in many countries, including Nigeria. These enterprises typically occupy a middle ground between small and large-scale enterprises in size, revenue, and market reach. MSEs play a crucial role in various sectors such as manufacturing, retail, services, and agriculture, driving innovation, competition, and productivity. For example, research by Barine (2021) highlights the entrepreneurial characteristics and performance of MSEs in Port Harcourt Metropolis, showcasing their contributions to local economic growth and employment generation.

Moreover, the performance of MSEs is often influenced by factors such as access to finance, market demand, regulatory environment, and technological capabilities. Despite their potential for growth and expansion, MSEs face several challenges that can impede their performance. These challenges may include limited access to credit and capital, infrastructure deficiencies, bureaucratic hurdles, and market competition. For instance, Oladejo (2008) emphasizes the roles of SMEs, including MSEs, in the Nigerian economy but also underscores the challenges they encounter, such as financial constraints and regulatory bottlenecks. Therefore, understanding the dynamics of MSE performance and addressing their obstacles are essential for fostering their growth and contribution to economic development.

2.4 Development of Research Hypotheses

The research hypothesis stating that "there is no significant difference in factors influencing the implementation of technological entrepreneurship by Medium-Scale Enterprises in the Food Processing and Beverages sector" is crucial for several reasons. Firstly, the food processing and beverages sector is a vital component of the economy in many countries, including Nigeria, contributing significantly to GDP and employment. Understanding the factors that influence the implementation of technological entrepreneurship in this sector is essential for enhancing its competitiveness, productivity, and sustainability (Blueprint Newspaper, 2021). Additionally, technological entrepreneurship can play a transformative role in improving food processing and beverage production processes, product quality, and market reach. However, without empirical evidence on the factors influencing technological entrepreneurship implementation in this sector, policymakers, industry stakeholders, and entrepreneurs may lack actionable insights to guide strategic decision-making and resource allocation (Akande & Oladejo, 2013). Therefore, investigating whether there are significant differences in these factors among Medium-Scale Enterprises in the food processing and beverages sector is necessary to inform targeted interventions and initiatives to promote technological innovation and entrepreneurship in this critical industry (Olasanmi & Ojubanire, 2020). Consequently, the first research hypothesis was formulated:

H_{01}: **There is no significant difference in factors influencing the implementation of technological entrepreneurship by Medium-Scale Enterprises.**

The second research hypothesis, positing that "there is no significant relationship between technological entrepreneurship implementation and the business performance of Medium-Scale Enterprises," is imperative for guiding strategic decision-making and resource allocation in support of SME development (Rehman et al., 2018). By examining this relationship, policymakers, investors, and business owners can gain valuable insights into the effectiveness of technological innovation and entrepreneurship investments in driving tangible improvements in business performance metrics such as profitability, market share, and competitiveness (Okpalaoka et al., 2022). Moreover, understanding this relationship is essential for SMEs themselves, as it can inform their strategic planning and resource allocation decisions, enabling them to prioritize innovation initiatives effectively amidst resource constraints and dynamic market conditions (Imagha et al., 2023). Therefore, investigating the presence and nature of the relationship between technological entrepreneurship implementation and business performance in Medium-Scale Enterprises is vital for informing evidence-based policies and strategies aimed at fostering SME growth and competitiveness. Against this backdrop, the second research hypothesis was formulated:

> ***H_{02}:*** **There is no significant relationship between technological entrepreneurship implementation and the business performance of Medium-Scale Enterprises.**

2.5 Theoretical Underpinning

Two salient theories relevant to demystifying the role of technological entrepreneurship on the performance of Medium-Scale Enterprises (MSEs) are the Resource-Based View (RBV) and the Dynamic Capability Theory (DCT). The RBV, propounded by Wernerfelt in 1984, suggests that a firm's competitive advantage lies in its unique resources and capabilities rather than in external market conditions (Wernerfelt, 1984). In the context of MSEs and technological entrepreneurship, this theory argues that firms can achieve sustained competitive advantage and superior performance by leveraging internal resources such as technological capabilities, innovation processes, and knowledge assets (Nikraftar et al., 2022). For example, MSEs in Nigeria's food processing and beverages sector can enhance their performance by investing in technological innovation to develop new products, improve production processes, and meet changing consumer preferences (Blueprint Newspaper, 2021). Thus, the RBV provides a theoretical foundation for understanding how MSEs can use technological entrepreneurship to drive performance through resource leveraging and capability development.

Complementing the RBV, the Dynamic Capability Theory (DCT) posits that firms must continuously adapt and renew their resources and capabilities to respond to dynamic market environments and sustain competitive advantage (Teece et al., 1997). Rooted in the work of Teece and colleagues in 1997, this theory emphasizes the importance of firms' ability to sense, seize, and reconfigure resources in response to changing technological, market, and competitive conditions (Teece et al., 1997). In the context of MSEs and technological entrepreneurship, DCT underscores the need for firms to proactively engage in innovation, experimentation, and learning to stay competitive and achieve superior performance (Okpalaoka et al., 2022). For instance, MSEs in Nigeria can enhance their business performance by developing dynamic capabilities that enable them to quickly adopt and adapt emerging technologies, exploit market opportunities, and respond to competitive threats (Akinyele et al., 2023). Thus, DCT provides valuable insights into how MSEs can leverage technological entrepreneurship to build agility, resilience, and competitiveness in rapidly evolving markets.

3. Methodology

In the study examining the impact of technological entrepreneurship on medium-sized enterprises (SMEs) in the food and beverage processing sector, a comprehensive research design was adopted, drawing on both quantitative and qualitative methodologies (Creswell, 2003). Lagos State, renowned as Nigeria's commercial epicenter and home to a substantial number of MSEs, particularly in the food and beverage processing industry, served as the focal point of the investigation (SMEDAN, 2013). Using purposeful and random sampling techniques, fifteen MSEs were meticulously selected based on technology adoption and accessibility criteria from the directory of registered enterprises, constituting a population of 93 eligible entities (Directory.org.ng). Through the administration of structured questionnaires as the primary data collection tool and the retrieval of secondary data from annual reports spanning from 2018 to 2022, a robust dataset was curated to facilitate the investigation.

Despite the initial target population of 150 respondents, a commendable response rate of 86% was achieved, with 130 MSEs actively participating in the study (Creswell, 2003). Subsequently, the collected data underwent rigorous analysis, employing a blend of descriptive statistics, correlation, and regression analyses to scrutinize the two hypotheses posited in the research framework. By juxtaposing the technological

entrepreneurship practices within MSEs against their performance indicators, the study aimed to unveil insights into the relationship between technological innovation and business outcomes in the food and beverage processing sector. Through meticulous examination and interpretation of the findings, the research endeavors to offer valuable insights and practical implications for MSEs seeking to leverage technological entrepreneurship to enhance their competitiveness and sustainability in a dynamic business landscape.

4. Results and Discussion

4.1 There is no significant difference in factors influencing the implementation of technological entrepreneurship by MSEs in the Food Processing and Beverages sector.

The findings presented in Table 1 shed light on the factors influencing the implementation of technological entrepreneurship by Medium-Scale Enterprises (MSEs) within the food and beverage processing sector. Table 1 provides descriptive statistics summarizing the factors influencing the implementation of technological entrepreneurship by Medium-Scale Enterprises (MSEs) in the food and beverage processing sector. The table outlines variables such as Business Size (BS), Perceived Ease of Use (PEU), Cost of ICT Deployment (CID), Perceived Benefit (PB), Market Dynamism (MD), and Business Environment (BE), along with their respective frequencies and percentages. Notably, the Business Environment emerges as the most influential factor, with 81% of respondents indicating a "Very High" influence, resulting in a mean score of 3.42 and securing the top rank. Market Dynamism follows closely behind, with 55% of respondents perceiving a "Very High" influence. In contrast, factors such as Business Size and Cost of ICT Deployment exhibit relatively lower influence, with a notable proportion of respondents indicating "No Influence." Overall, the table provides valuable insights into the perceived importance of various factors in driving technological entrepreneurship within MSEs, offering a comprehensive overview of their impact on business performance and innovation adoption.

Table 1: Descriptive Statistics

Variables	Very High Freq (%)	High Freq (%)	Undecided Freq (%)	Low Freq (%)	No Influence Freq (%)	Mean (Std. Dev)	Rank
Business Size (BS)	5 (4)	24 (18)	-	10 (8)	91 (70)	2.94 (0.99)	3
Perceived Ease of Use (PEU)	110 (84)	-	5 (4)	7 (5)	8 (6)	2.93 (0.86)	4
Cost of ICT Deploy (CID)	96 (74)	12 (9)			22 (17)	2.82 (0.89)	5
Perceived Benefit (PB)	116 (89)	- -	5 (4)	- -	9 (7)	2.62 (0.81)	6
Market Dynamism (MD)	72 (55)	10 (8)	7 (5)	- -	31 (24)	3.17 (0.87)	2
Business Environment (BE)	105 (81)	- -	14 (11)	- -	11 (8)	3.42 (0.91)	1

Source: Data Analysis (2023)

The Table shows that the results underscore the paramount importance of the Business Environment, which emerged as the most influential factor according to the perceptions of respondents. This finding resonates with the works of scholars such as Aderemi et al. (2008), who emphasized the critical role of the business environment in shaping entrepreneurial activities and technological innovation within SMEs.

Furthermore, the high rating and mean score associated with Market Dynamism align with the study of Akinyele, Akintola, and Akinyele (2023), who highlighted the significance of adapting to dynamic market conditions for sustainable business growth. Despite some uncertainty among respondents, the prominence of Perceived Benefit corroborates the submission of Nicodemus, Mowaiye, and Fasola (2020), who emphasized the need for SMEs to perceive tangible benefits from technological investments to drive adoption and implementation.

Moreover, the findings suggest that factors such as Business Size and Cost of ICT Deployment wield relatively lower influence on technological entrepreneurship implementation, aligning with the study of Okpalaoka et al. (2022), which emphasized the varying impact of contextual factors on technology adoption and utilization within SMEs. The moderate mean score associated with Perceived Ease of Use resonates with the findings of Rehman et al. (2018), who highlighted the importance of balancing perceived ease of use with other contextual factors to drive successful technology adoption and integration. Overall, the findings provide valuable insights into the nuanced interplay between environmental, market, and perceptual factors influencing technological entrepreneurship within MSEs, offering practical implications for policymakers, industry stakeholders, and SME owners seeking to leverage technology for business growth and sustainability.

Table 2 presents the findings from the regression analysis investigating the factors influencing the implementation of technological entrepreneurship by Medium-Scale Enterprises (MSEs). The table includes variables such as Business Size (BS), Perceived Ease of Use (PEOU), Cost of Technology Deployment (CID), Perceived Benefit (PB), Market Dynamism (MD), and Business Environment (BE), along with their respective coefficients, standard errors, t-statistics, and p-values. A significant positive relationship is observed between Business Size and technological entrepreneurship implementation, as indicated by a coefficient of 10.05408, a t-statistic of 3.05, and a p-value of 0.002. Similarly, Perceived Ease of Use demonstrates a significant positive relationship with a coefficient of 26.38036, a t-statistic of 9.08, and a p-value of 0.004. Conversely, a significant negative relationship is found between the Cost of Technology Deployment and technological entrepreneurship implementation, with a coefficient of -8.962621, a t-statistic of -4.01, and a p-value of 0.000.

Moreover, significant positive relationships are identified between Perceived Benefit (coefficient: 19.65886), Market Dynamism (coefficient: 11.19738), and Business Environment (coefficient: 13.13338) with technological entrepreneurship implementation, supported by their respective t-statistics and p-values. The constant term in the regression model also demonstrates significance, suggesting overall model significance. With an F-statistic of 300.03 and an R-squared value of 0.9237, the model effectively explains a substantial portion of the variability in technological entrepreneurship implementation by MSEs. The adjusted R-squared value of 0.9206 further confirms the robustness of the model. Overall, these results underscore the significant contribution of the identified factors in explaining the variance in technological entrepreneurship implementation by MSEs, highlighting their implications for business strategies and performance enhancement

Table 2: Regression Analysis

Variables	Coefficient	Std.Err	T	P>{T}
Business Size (BS)	10.05408	3.295244	3.05	0.002
Perceived Ease of Use (PEOU	26.38036	2.905232	9.08	0.004
Cost of Technology Deployment (CID)	-8.962621	2.236267	-4.01	0.000
Perceived Benefit (PB)	19.65886	3.667428	5.36	0.000
Market Dynamism (MD)	11.19738	3.351445	3.34	0.001
Business Environment (BE)	13.13338	2.434452	3.84	0.001
Constant	271.3349	9.52564	28.48	0.000

F(5, 124) 300.03; R^2= 0.9237; AdjR^2 =0.9206; Sig. 0.0001; Root MSE = 10.417

The implications of the regression analysis findings on the factors influencing technological entrepreneurship implementation by Medium-Scale Enterprises (MSEs) are significant for business strategy and performance enhancement. The observed positive relationship between factors such as Business Size, Perceived Ease of Use, Perceived Benefit, Market Dynamism, and Business Environment with technological entrepreneurship underscores the importance of these elements in fostering innovation and growth within MSEs. These findings resonate with previous research by Singh, Khamba, and Nanda (2017), who also identified factors such as market dynamism and business environment as key drivers of innovation and performance in small manufacturing companies. Additionally, the negative relationship between the Cost of Technology Deployment and technological entrepreneurship implementation highlights the financial challenges MSEs face in adopting and integrating new technologies into their operations. Therefore, it can be concluded that addressing these challenges while leveraging the identified facilitating factors can significantly enhance the technological entrepreneurship landscape in MSEs, ultimately contributing to their sustainable growth and competitiveness in the market.

4.2 There is no significant impact of technological entrepreneurship implementation and the business performance of medium-scale enterprises.

The descriptive statistics presented in Table 3 reveal important insights into the financial and operational aspects of the selected firms. The mean Sales Turnover (ST) of 1.36E+08 highlights the scale of business operations, with a wide range of turnover values indicating varied business sizes within the sample. The substantial mean Training and Development Cost (TDC) of 1.52E+08 underscores the investment made by these firms in human capital development, crucial for enhancing workforce skills and competencies. Similarly, the mean Training and Research Development Cost (TDRC) of 17057224 reflects the importance of innovation and research activities in driving business growth and competitiveness. However, the positive skewness and high kurtosis values across all variables suggest non-normality in the data distribution, indicating the need for caution in interpreting the results. The normal distribution of the sample data, as confirmed by the Jarque-Bera Test, provides confidence in the reliability of the findings, facilitating more robust analysis and decision-making processes within the MSEs.

Table 3: Summary of Descriptive Statistic

	ST	TDC	HRC	TRDC
Mean	1.36E+08	1.52E+08	56142147	17057224
Median	78744081	98463387	24738642	7432071.
Maximum	7.72E+08	1.29E+09	3.22E+08	2.17E+08
Minimum	0. 010200	0.001010	0.004600	0.096700
Std. Dev.	1.64E+08	2.01E+08	74179908	38440508
Skewness	1.884402	2.842687	1.636809	4.066770
Kurtosis	6.436850	14.92587	4.751871	19.79145
Jarque-Bera	81.29942	545.4685	43.08007	1087.835
Probability	0.000000	0.000000	0.000000	0.000000
Sum	1.02E+10	1.14E+10	4.21E+09	1.28E+09
Sum Sq. Dev.	1.98E+18	3.00E+18	4.07E+17	1.09E+17
Observations	**75**	**75**	**75**	**75**

Source: Computed by researcher analysis with E-view 10.0

The findings from Table 3 reveal significant implications for the financial and operational management of MSEs. The considerable range of Sales Turnover (ST) values, from 0.010200 to 7.72E+08, underscores the diverse scale of business operations within the sample, indicating varying levels of revenue generation among MSEs. Moreover, the substantial Training and Development Cost (TDC) and Training and Research Development Cost (TDRC) figures highlight the importance of investing in human capital development and innovation to drive business growth and competitiveness. However, the positive skewness and high kurtosis values suggest non-

normality in the data distribution, indicating potential challenges in accurately assessing financial performance and operational efficiency. These findings align with the works of Dorf and Byers (2005), who emphasized the importance of investment in training and research development for fostering innovation and sustainable growth in technology ventures. Additionally, the positive skewness and high kurtosis observed in the financial variables resonate with the findings of Munasinghe (2015), who highlighted similar patterns in the financial data of small and medium enterprises. Furthermore, the confirmation of normal distribution through the Jarque-Bera Test corroborates the submission of Creswell (2003), emphasizing the significance of assessing data distribution characteristics for ensuring the validity of statistical analyses. Overall, it can be concluded that the financial and operational insights gained from these findings have significant implications for strategic decision-making and resource allocation in MSEs, emphasizing the importance of investing in human capital development and innovation to enhance business performance and competitiveness.

Table 4 displays the Pearson correlation matrix, revealing the correlation coefficients between Sales Turnover (ST) and the variables of interest: Technology Deployment Cost (TDC), Human Resource Cost (HRC), and Training and Research Development Cost (TRDC). The correlation coefficient between Sales Turnover and Technology Deployment Cost is 0.7023, with a t-statistic of 8.429159 and a probability of 0.0000, indicating a robust positive correlation. This signifies that as technology deployment costs increase, sales turnover has a substantial tendency to increase significantly. Similarly, the correlation coefficient between Sales Turnover and Human Resource Cost is 0.5906, with a t-statistic of 6.2524 and a probability of 0.0000, suggesting a positive correlation. As human resource costs rise, sales turnover has a notable inclination to increase. Moreover, the correlation coefficient between Sales Turnover and Training and Research Development Cost is 0.6562, with a t-statistic of 7.4302 and a probability of 0.0000, indicating a robust positive correlation. This implies that an increase in Training and Research Development Costs is significantly associated with an increase in Sales Turnover.

Table 4 Pearson Correlation Matrix

Correlation t-Statistic				
Probability	ST	TDC	HRC	TRDC
ST	1.000000			
TDC	0.702306	1.000000		
	8.429159			
	0.0000			
HRC	0.590553	0.557714	1.000000	
	6.252404	5.740865		
	0.0000	0.0000		
TRDC	0.656209	0.370141	-0.001658	1.000000
	7.430163	3.404270	-0.014167	
	0.0000	0.0011	0.9887	

Source: Data Analysis (2023)

The findings presented in Table 4, the Pearson Correlation Matrix, underscore significant associations between Sales Turnover (ST) and the variables of interest: Technology Deployment Cost (TDC), Human Resource Cost (HRC), and Training and Research Development Cost (TRDC). The robust positive correlation coefficients between Sales Turnover and both Technology Deployment Cost (0.7023) and Training and Research Development Cost (0.6562) suggest that investing in technology deployment and research development positively impacts sales turnover. This aligns with previous research by Singh, Khamba, and Nanda (2017), who found a similar positive relationship between technological innovation and company performance. Additionally, the positive correlation between Sales Turnover and Human Resource Cost (0.5906) implies that investing in human resources also contributes positively to sales turnover. This finding resonates with the study by Nicodemus et al. (2020), which demonstrated the positive impact of entrepreneurial competence, a factor closely related to human resources, on SMEs' performance in Nigeria. Therefore, the implications of these findings suggest that MSEs in the food and beverage sector can enhance their sales turnover by strategically allocating resources to technology deployment, research development, and human resource investment.

Furthermore, the significant correlations observed in Table 4 underscore the interconnectedness of various operational aspects within MSEs and their impact on sales turnover. The findings corroborate the submission of Dandago and Rufai (2014), who highlighted the importance of information technology and accounting systems in the Nigerian banking industry, suggesting that technological investments can enhance financial performance. Moreover, the negligible correlation coefficient between Human Resource Cost and Training and Research Development Cost (0.001658) implies that these two aspects may operate independently in influencing sales turnover. This finding aligns with the study by Imagha et al. (2023), which emphasized the distinct contributions of technological skills and managerial performance to the overall performance of SMEs in Nigeria. In conclusion, these findings underscore the multifaceted nature of factors influencing sales turnover in MSEs and emphasize the need for strategic resource allocation to maximize performance outcomes.

5. Conclusion and Recommendations

5.1 Conclusion

This study highlights the significant role of various factors in influencing the implementation of technological entrepreneurship in Medium-Scale Enterprises (SMEs) operating within the food processing and beverage sectors in Lagos State, Nigeria. The findings indicate that variables such as business size, perceived ease of use, cost of technology deployment, perceived benefit, market dynamics, and business environment play crucial roles in shaping the technological entrepreneurial landscape of these enterprises. By understanding and effectively managing these factors, MSEs can enhance their capacity for innovation, adaptability, and competitiveness in an increasingly dynamic business environment.

Moreover, the identification of major obstacles hindering technological entrepreneurship implementation, such as Inconsistency in Government Policy, Lack of Proper IT Proficiency, Fear of Data Insecurity, High Cost of Technology Deployment, and Legacy Culture Thinking/Reluctance to Change, underscores the need for targeted interventions and policy initiatives to address these challenges. Addressing these barriers fosters a conducive environment for technological entrepreneurship and promotes job creation, economic inclusivity, skills development, and technology transfer, ultimately contributing to sustainable economic growth and development. Therefore, policymakers, business leaders, and other stakeholders should collaborate to create supportive ecosystems that encourage and facilitate technological entrepreneurship in MSEs, thereby harnessing its full potential for societal and economic advancement.

5.2 Recommendations and policy Implications

Based on the conclusions drawn from this study, it is recommended that entrepreneurs in Medium-Scale Enterprises (MSEs) operating in the food processing and beverages sectors prioritize the enhancement of their technological capacity. This entails investing in modern technologies and providing comprehensive capacity-building programs for their human resources. By doing so, MSEs can effectively leverage technological entrepreneurship practices to drive innovation, streamline operations, and enhance overall business performance. Furthermore, integrating technology usage into the business plan is crucial for MSEs to align their technological initiatives with their corporate strategy. This alignment ensures that

technological investments are strategically directed towards achieving specific business objectives, thereby maximizing the potential benefits of technological entrepreneurship.

Additionally, policymakers and relevant stakeholders should recognize the importance of fostering an enabling environment for technological entrepreneurship in MSEs. This includes implementing supportive policies and initiatives aimed at reducing barriers to technology adoption, promoting digital literacy, and incentivizing technological innovation among MSEs. Moreover, there is a need for collaborative efforts between government agencies, industry associations, educational institutions, and private sector organizations to provide MSEs with access to resources, expertise, and networks that facilitate the effective adoption and utilization of technology. By creating such an ecosystem, policymakers can empower MSEs to harness the transformative power of technology, drive economic growth, and contribute to the development of a vibrant and competitive business landscape in Nigeria's food processing and beverages sectors.

6. Contribution to Knowledge and Suggestions for further Studies

This study significantly contributes to the understanding of entrepreneurial development by empirically identifying determinant variables of technological entrepreneurial implementation and their impact on the performance of medium-scale enterprises (MSEs) in the food and beverage sectors of Lagos State, Nigeria. By establishing these variables, the research provides valuable insights into how MSEs can effectively leverage technological entrepreneurship to enhance their competitiveness and overall performance. Moreover, this study lays the groundwork for further exploration in related areas such as business innovation management and entrepreneur performance, particularly within the context of the food processing and beverage sectors in Nigeria. Future research endeavors could delve deeper into additional performance indices beyond sales turnover, such as customer satisfaction, service quality, and employee engagement, to provide a more comprehensive understanding of MSE performance dynamics. By expanding the scope of investigation to encompass these broader dimensions, researchers can gain deeper insights into the multifaceted nature of technological entrepreneurship and its implications for MSEs in Nigeria's evolving business landscape.

REFERENCES

1. Aderemi, H. O., Ilori, M. O., Siyanbola, W. O. I., & Adegbite, S. A. (2008). An assessment of the choice and performance of women entrepreneurs in technological and non-technological enterprises in southwestern Nigeria. *African Journal of Business Management*, *2*(10), 165.
2. Aigboduwa, O. J., &Oisamoje, M. D. (2013). Customer satisfaction in banking industry: A comparative study of conventional and Islamic banks in Nigeria. *Journal of Business and Management*, 7(1), 24-31.
3. Akande, O. O (2015). Does information technology (IT) influence entrepreneurial operations efficiency: an empirical investigation of the Nigerian Small and Medium Businesses SMBs. *IOSR Journal of Business and Management (IOSR-JBM)*, 17,(4), 19-24
4. Akande, O. O., and Oladejo, M. O (2013). An appraisal of technological entrepreneurship development programmes on the performance of selected SMES in Lagos- Nigeria. Issues Bus. Manag. Econ. 1(8),208-217
5. Akinwale, A. A., Adepoju, O. O., &Olomu, A. A. (2017). Adoption of e-commerce by SMEs in Nigeria: Challenges and prospects for the future. *Covenant Journal of Entrepreneurship*, 2(1), 47-62.
6. Akinyele, S. T., Akintola, D. A., & Akinyele, E. F. (2023). Appropriate Entrepreneurial Technology usage and Small and Medium Scale Enterprises Performance in Odeda Local Government Area, Ogun State, Nigeria. *Journal of Business Development and Management Research*.
7. Albrecht, S. I. (2011). Handbook of Employee Engagement: Perspective, issues, research and practice. Edward Elgar Publishing
8. Bailetti, T. (2012). Technology Entrepreneurship: Overview, Dentition and Distinctive Aspects. Technology Innovation Management, Review. 2012, 2, 5–12.
9. Baker, W. H., Rees, J. E., &Mósenzon, O. (2005). Advanced financial accounting (6th ed.). McGraw-Hill/Irwin.
10. Barine, L. O. (2021). Entrepreneurial characteristics and performance of small and medium scale enterprises in Port Harcourt Metropolis. *World Journal of Entrepreneurial Development Studies*, *6*(1), 11-31.
11. Blueprint Newspaper (2021). Food and beverage industry in Nigeria, September 30, 2021. Pp. 35

12. Clausen, T. H. (2006). Investigating the entrepreneurial attitudes of students in Norway. Education + Training, 48(2/3), 142.
13. Creswell, J. W. (2003). Research Design: Qualitative, quantitative, and mixed methods approaches (2nd edition.). Sage Publications
14. Dandago, K. I., and Rufai, A. S. (2014). Information Technology and Accounting Information System in the Nigerian Banking Industry. *Asian Economic and Financial Review*, 4, 655-670
15. Dorf, R. C. & Byers, H.T. (2005). Technology Ventures: from Idea to Enterprise, New York, McGraw-Hill
16. Durowoju, O. A. (2017). Technological entrepreneurship and sustainable development in Nigeria. *International Journal of Economics, Commerce and Management*, 5(4), 130-141.
17. European Commission. (2003). Towards a European research area. Brussels: European Commission.
18. bekwe, A. O., Ogbonnia, A. A., Ibekwe, A. I. (2021). Financial Inclusion and Entrepreneurship Development in Nigeria. *JETMASE*. 3(1): 90-104. https://www.jetmase.com
19. Igwe, S. R., Ebenuwa, A., & Idenedo, O. W. (2020). Technology adoption and sales performance of manufacturing small and medium enterprises in port harcourt. *Journal of Marketing*, *5*(1), 44-59.
20. Ilori, M. O. (2006). "From Science to Technology and Innovation," Inaugural Lecture Series, ObafemiAwolowo University, Ile-Ife, 2006, 191, 37.
21. Imagha, O. A., Akpaetor, U. A., Nkanor, W. N., & Umana, E. S. (2023). Technological Skills and the Performance of Managers of Small and Medium Scale Enterprises in Uyo, Akwa Ibom State, Nigeria. *International Journal of Small Business and Entrepreneurship Research*, *11*(1), 40-53.
22. Munasinghe, P. G. (2015). Factors Influence on Usage of Computerized Accounting System on Small and Medium Scale Enterprises, *International Conference on Contemporary Management, Faculty of Management Studies and Commerce*, University of Jaffna
23. Nicodemus, O. A., Mowaiye, O. E., &Fasola, O. A. (2020). Entrepreneurial orientation, entrepreneurial competence and SMEs performance in *Nigeria. Journal of Small Business and Enterprise Development.* https://doi.org/10.1108/JSBED-12-2019-0405.
24. Nigeria Bureau of Statistics. (2010). Nigerian living standards survey: 2009/2010 report. National Bureau of Statistics.
25. Nikraftar, T., Hosseini, E., and Mohammadi, E. (2022). The Factors Influencing Technological Entrepreneurship in Nanotechnology Business. *Revista de Gestao*, 29(1), 76-99. https://doi.org/10.1108/REGE-02-2021-0029
26. Okpalaoka, C., Ogunnaike, O., Kalu, A., Yaya, T., Usendiah, E., & Emmanuel, E. (2022). Effect of technological innovation capabilities on the performance of selected manufacturing small and medium enterprises in Lagos State. *F1000Research*, *11*, 256.
27. Oladejo, M. O. (2008). Roles of Small and Medium-sized Enterprises (SMEs) in the Nigerian Economy. *Research Journal of Business Management*, 2(1), 35-44.
28. Olasanmi, O. O., & Ojubanire, O. A. (2020). Technological innovativeness and business financial performance of medium sized enterprises in Southwestern Nigeria. *The International Journal of Business & Management*.
29. Olowe, R., Ajeigbe, O., &Olowe, O. (2017). The Impact of Entrepreneurial Education on Entrepreneurial Intention of Agriculture Students in Nigeria. *Journal of Agricultural Education and Extension*, 23(1), 37-51.
30. Osita-Ejikeme, U. E., & Onuoha, B. C. (2021). Technological Advancements and Entrepreneurial Orientation of Small and Medium Scale Enterprises in Rivers State. *African Journal of Business and Economic Development| ISSN*, *2782*, 7658.
31. Oyeku, O. T., Adeniji, S. O., &Adetula, D. T. (2014). Entrepreneurship and technical vocational education in Nigeria: Issues and challenges. *Journal of Education and Practice*, 5(34), 147155.
32. Petti, C. (Ed.) (2009). Cases in technological entrepreneurship: Converting ideas into value. Northampton, MA: Edward Elgar Publishing.
33. Rehman, N., Nor, M. N. M., Taha, A. Z., & Mahmood, S. (2018). Impact of information technology capabilities on firm performance: Understanding the mediating role of corporate entrepreneurship in SMEs. *Academy of Entrepreneurship Journal*, *24*(3), 1-19.
34. Singh, D., Khamba, J. S., & Nanda, T. (2017). Influence of technological innovation on performance of small manufacturing companies. *International Journal of Productivity and Performance Management*, *66*(7), 838-856.

35. Siyanbola, W.O., Aderemi, H.O., Egbetokun, A.A., and Sanni, M. (2011). Framework for technological entrepreneurship development: Key issues and policy directions. *American Journal of Industrial and Business Management,* 1(1), 10-17
36. Small and Medium Enterprises Development Agency of Nigeria [SMEDAN], (2015). SMEDAN & Nigeria Bureau of Statistics (NBS): *Survey report on micro, small, and medium enterprises in Nigeria.* Retrieved from http://www.nigerianstat.gov.ng
37. Tuffour, J. K., Agbaam, M. A., Edzeame, F. L., Aye-Darko, E. E. N., & Darko, K. (2018). Innovative performance of small and medium scale enterprises. *Journal of Business and Economic Development*, *3*(4), 106-112.