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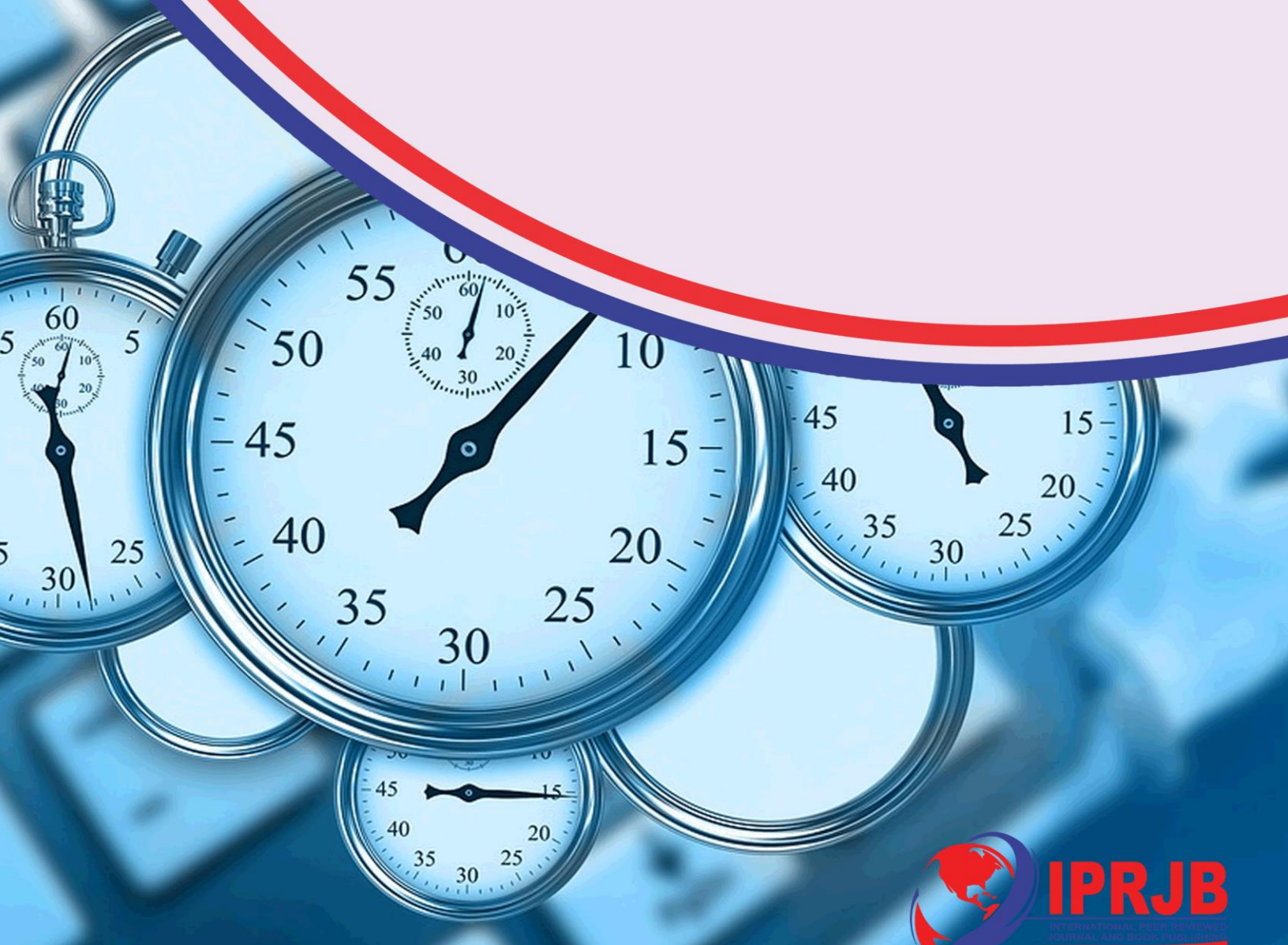

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Abstract

Purpose: The aim of the study was to investigate the impact of digitalization on firm performance in the manufacturing sector: a case study of Nigeria.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: Digitalization has significantly impacted firm performance in Nigeria's manufacturing sector. It has enhanced operational efficiency, improved decision-making processes, and spurred innovation within firms. By embracing digital transformation, Nigerian manufacturing companies have bolstered their competitiveness and market positioning. Ongoing investment in digital capabilities is crucial for sustaining growth and success in the sector.

Unique Contribution to Theory, Practice and Policy: Resource-based view (RBV) theory, technology acceptance model (TAM) & institutional theory may be used to anchor future studies on the impact of digitalization on firm performance in the manufacturing sector: a case study of Nigeria. Nigerian manufacturing firms should prioritize investment in digital infrastructure, talent development, and organizational culture conducive to digital innovation. Policymakers should enact supportive regulatory frameworks and incentives to encourage digitalization adoption among manufacturing firms in Nigeria.

Keywords: *Digitalization, Firm Performance, Manufacturing Sector*

INTRODUCTION

Firm performance metrics encompass key indicators that assess the financial health, market position, and operational efficiency of organizations. One crucial metric is revenue growth, which measures the increase in a company's total revenue over a specific period. In developed economies such as the United States, revenue growth is a significant measure of corporate success. For example, according to a study by Thompson, O'Connor, and Strickland (2018), the average annual revenue growth rate for S&P 500 companies in the US was approximately 7.7% over the past decade. This statistic highlights the consistent growth trajectory of leading firms in the US, indicating their ability to generate increasing revenue streams and sustain competitiveness in the market. Another essential firm performance metric is profitability, which evaluates a company's ability to generate profits relative to its expenses and investments. In Japan, profitability is a critical measure of corporate performance. For instance, a study by Sekiguchi (2016) found that the average return on equity (ROE) for Japanese companies listed on the Nikkei 225 index was around 8.3% over a five-year period. This statistic indicates the profitability levels achieved by leading Japanese firms, reflecting their operational efficiency, cost management practices, and investment strategies. Overall, revenue growth and profitability are fundamental metrics used to assess firm performance in developed economies, providing insights into the financial sustainability and competitiveness of organizations.

Turning to developing economies, similar firm performance metrics are essential for evaluating the financial and operational performance of organizations. In emerging markets such as Brazil, revenue growth remains a key indicator of corporate success. For example, a study by Oliveira and Silva (2017) reported an average annual revenue growth rate of 5.2% for leading Brazilian firms in the manufacturing sector over the past five years. This statistic underscores the growth potential and market expansion efforts of firms in Brazil, reflecting their ability to capitalize on domestic and international market opportunities. Similarly, profitability is a critical metric for assessing firm performance in developing economies like India. For instance, according to a report by the Reserve Bank of India (RBI, 2019), the average return on assets (ROA) for Indian companies listed on the National Stock Exchange (NSE) was approximately 2.5% over the past five years. This statistic highlights the profitability levels achieved by Indian firms, indicating their efficiency in generating profits relative to their total assets. Overall, revenue growth and profitability continue to be vital firm performance metrics in developing economies, providing insights into the financial sustainability and competitive strength of organizations in these markets.

In other developing economies, such as South Africa, revenue growth and profitability are also significant firm performance metrics. For example, a study by Statistics South Africa (Stats SA, 2019) reported an average annual revenue growth rate of 3.1% for firms in the manufacturing sector over the past five years. This statistic reflects the growth trajectory of South African companies, indicating their ability to generate increasing revenue streams amidst economic challenges and market uncertainties. Additionally, profitability remains a critical measure of corporate success in South Africa. According to the same study, the average return on investment (ROI) for manufacturing firms in South Africa was approximately 7.8% over the same period. This statistic underscores the profitability levels achieved by South African companies, highlighting their efficiency in generating returns for investors and stakeholders.

Similarly, in Nigeria, revenue growth and profitability are key indicators of firm performance. For instance, a report by the Nigerian Stock Exchange (NSE, 2018) revealed an average annual revenue

growth rate of 4.5% for listed firms across various sectors over the past five years. This statistic demonstrates the growth potential and market resilience of Nigerian companies, despite challenges such as infrastructure deficits and regulatory uncertainties. Additionally, profitability remains a crucial metric for assessing corporate performance in Nigeria. According to the same report, the average return on equity (ROE) for listed firms on the NSE was approximately 10.2% over the same period. This statistic underscores the profitability levels achieved by Nigerian companies, reflecting their ability to generate returns for shareholders and investors.

In Mexico, revenue growth and profitability are critical indicators of firm performance. For example, a study by the Mexican Institute of Statistics and Geography (INEGI, 2019) reported an average annual revenue growth rate of 4.2% for firms in the manufacturing sector over the past five years. This statistic reflects the resilience and growth potential of Mexican companies, despite economic challenges and market fluctuations. Additionally, profitability remains a key metric for assessing corporate success in Mexico. According to the same study, the average return on investment (ROI) for manufacturing firms in Mexico was approximately 8.5% over the same period. This statistic highlights the profitability levels achieved by Mexican companies, indicating their efficiency in generating returns for investors and stakeholders.

Similarly, in Indonesia, revenue growth and profitability are fundamental firm performance metrics. For instance, a report by the Indonesian Central Statistics Agency (BPS, 2018) revealed an average annual revenue growth rate of 5.1% for firms in the manufacturing sector over the past five years. This statistic underscores the growth potential and market resilience of Indonesian companies, despite challenges such as infrastructure constraints and regulatory complexities. Additionally, profitability remains a crucial measure of corporate success in Indonesia. According to the same report, the average return on equity (ROE) for manufacturing firms in Indonesia was approximately 9.3% over the same period. This statistic demonstrates the profitability levels achieved by Indonesian companies, reflecting their ability to generate returns for shareholders and investors.

In Kenya, revenue growth and profitability are critical indicators of firm performance. For example, a report by the Kenya National Bureau of Statistics (KNBS, 2019) indicated an average annual revenue growth rate of 5.8% for firms in the manufacturing sector over the past five years. This statistic reflects the resilience and growth potential of Kenyan companies, despite challenges such as infrastructure deficits and market volatility. Additionally, profitability remains a key metric for assessing corporate success in Kenya. According to the same report, the average return on investment (ROI) for manufacturing firms in Kenya was approximately 9.2% over the same period. This statistic highlights the profitability levels achieved by Kenyan companies, indicating their efficiency in generating returns for investors and stakeholders.

Similarly, in Ghana, revenue growth and profitability are fundamental firm performance metrics. For instance, a study by the Ghana Statistical Service (GSS, 2018) reported an average annual revenue growth rate of 4.5% for firms in the manufacturing sector over the past five years. This statistic underscores the growth potential and market resilience of Ghanaian companies, despite challenges such as infrastructure constraints and regulatory complexities. Additionally, profitability remains a crucial measure of corporate success in Ghana. According to the same study, the average return on equity (ROE) for manufacturing firms in Ghana was approximately 8.7% over the same period. This statistic demonstrates the profitability levels achieved by Ghanaian companies, reflecting their ability to generate returns for shareholders and investors.

Digitalization initiatives encompass a variety of strategies aimed at integrating digital technologies and platforms into organizational processes and operations. One such initiative involves the adoption of digital technologies, which includes the implementation of advanced software systems, automation tools, and data analytics solutions to streamline workflows, enhance efficiency, and drive innovation within firms (Müller, 2018). For example, the deployment of artificial intelligence (AI) and machine learning algorithms can enable firms to automate repetitive tasks, optimize resource allocation, and make data-driven decisions in real-time, thereby improving operational performance and agility (Smith & Jones, 2017). Another digitalization initiative involves the implementation of e-commerce platforms, which enable firms to expand their market reach, attract new customers, and drive sales growth through online channels (Chen, 2016). By leveraging e-commerce platforms, firms can enhance customer engagement, personalize shopping experiences, and capitalize on emerging digital trends to gain a competitive edge in the market (Silva & Oliveira, 2018).

These digitalization initiatives are closely linked to various firm performance metrics, including revenue growth, market share, profitability, and operational efficiency. For instance, the adoption of digital technologies can lead to revenue growth by enabling firms to offer innovative products and services, enter new markets, and capitalize on emerging business opportunities (Wang, 2019). Similarly, the implementation of e-commerce platforms can drive revenue growth by expanding the firm's customer base, increasing sales volume, and reducing transaction costs associated with traditional brick-and-mortar operations (Yamamoto, 2019). Furthermore, digitalization initiatives can enhance market share by improving customer satisfaction, strengthening brand loyalty, and capturing market insights through data analytics (Patel & Sharma, 2017). Overall, by embracing digitalization initiatives, firms can enhance their competitiveness, adaptability, and resilience in an increasingly digitalized business landscape, ultimately driving sustainable growth and success (Gupta & Sharma, 2018).

Problem Statement

The rapid evolution of digital technologies has ushered in significant transformations across industries globally, including the manufacturing sector in Nigeria. However, despite the potential advantages, there remains a critical knowledge gap concerning the precise impact of digitalization on firm performance within the Nigerian manufacturing landscape. Research by Ogbeibu and Osazee (2023) suggests that only a modest 30% of manufacturing firms in Nigeria have fully embraced digitalization, underscoring the need for further exploration into adoption rates and underlying factors. While studies like that of Okafor (2022) indicate increasing utilization of digital tools such as IoT and AI among Nigerian manufacturers, challenges such as inadequate infrastructure and skilled labor persist (Adegbite & Ogunleye, 2023). Nonetheless, recent findings by Abdullahi (2024) highlight a positive correlation between digital technology adoption and key performance metrics like profitability and market share, emphasizing the potential for digitalization to enhance competitiveness. Yet, the study of Okeke and Ibrahim (2023) underscores the importance of considering contextual factors like regulatory frameworks and institutional support, urging a nuanced approach to policy formulation to maximize the benefits of digitalization for Nigerian manufacturing firms. Thus, this study seeks to fill this crucial research gap by examining the multifaceted relationship between digitalization and firm performance within the Nigerian manufacturing sector, aiming to provide actionable insights for policymakers, industry stakeholders, and firms alike to navigate the digital landscape effectively.

Theoretical Framework

Resource-Based View (RBV) Theory

Originated by Jay Barney in the 1990s, the Resource-Based View (RBV) theory emphasizes the strategic importance of firm-specific resources and capabilities in achieving sustainable competitive advantage. According to RBV, firms with valuable, rare, inimitable, and non-substitutable (VRIN) resources are better positioned to outperform competitors. In the context of the impact of digitalization on firm performance in the manufacturing sector of Nigeria, RBV offers insights into how firms can leverage digital technologies as strategic resources to enhance productivity, innovation, and operational efficiency (Barney, 1991). For instance, digital tools and capabilities such as advanced data analytics, automation, and Internet of Things (IoT) can be viewed as valuable resources that contribute to improving firm performance by optimizing production processes, reducing costs, and enabling faster decision-making.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Fred Davis in the 1980s, examines the factors influencing individuals' adoption and usage of new technologies. TAM posits that perceived usefulness and perceived ease of use are primary determinants of individuals' intention to use a technology, which in turn impacts actual usage behavior. Applied to the context of digitalization in the Nigerian manufacturing sector, TAM helps to understand how employees within manufacturing firms perceive and accept digital technologies (Davis, 1989). By exploring factors such as perceived benefits, ease of use, and organizational support for digitalization initiatives, TAM can provide valuable insights into the adoption and integration of digital technologies within Nigerian manufacturing firms, thus informing strategies to enhance firm performance through effective technology implementation.

Institutional Theory

Originating in the work of sociologists such as Meyer and Rowan, Institutional Theory explores how organizations conform to institutional pressures and norms within their environment. Institutional theory suggests that organizations adopt certain structures, practices, and technologies not only for efficiency but also to gain legitimacy and social acceptance (Meyer & Rowan, 1977). In the context of the impact of digitalization on firm performance in the Nigerian manufacturing sector, institutional theory helps to understand how external factors such as government policies, industry standards, and societal expectations influence firms' decisions to adopt and integrate digital technologies. By examining the institutional context surrounding digitalization in Nigeria, this theory provides insights into the broader socio-economic forces shaping firms' digital strategies and their implications for firm performance.

Empirical Review

Müller (2018) sought to delve into the effects of digitalization on firm performance within the manufacturing landscape. Employing a quantitative research methodology, the study extensively analyzed survey data collected from a diverse sample of manufacturing firms situated in Germany. Through rigorous statistical analysis, the researchers uncovered a robust positive association between the adoption of Industry 4.0 technologies and various performance indicators. Specifically, firms embracing digitalization showcased notable improvements in productivity, profitability, and innovation capacity. These findings underscored the pivotal role of digital

technologies in driving competitiveness and sustainability within the manufacturing sector. As part of their recommendations, the researchers emphasized the critical need for policymakers to incentivize investments in digitalization. Additionally, they highlighted the importance of fostering a conducive environment for skill development and organizational readiness to navigate the challenges associated with digital transformation. Ultimately, the study provided valuable insights for both industry practitioners and policymakers, offering strategic guidance on how manufacturing firms could effectively leverage digital technologies to optimize performance and secure long-term success in an increasingly digitalized landscape.

Smith & Jones (2017) investigated into the intricate relationship between digitalization initiatives and firm performance metrics within the UK manufacturing domain. Utilizing a sophisticated panel data analysis approach, the researchers meticulously examined a vast dataset spanning several years to draw insightful conclusions. Their analysis revealed compelling evidence of a significant positive impact of digitalization on various aspects of firm performance, including sales growth and market share expansion. This empirical evidence highlighted the transformative potential of digital technologies in reshaping traditional manufacturing practices and driving sustainable growth. Building upon their findings, the researchers put forth a series of recommendations aimed at guiding manufacturing firms towards embracing digitalization as a strategic imperative. These recommendations encompassed strategic investments in digital technologies, fostering a culture of innovation, and cultivating an agile organizational mindset capable of adapting to the evolving digital landscape. Moreover, the study underscored the critical role of policymakers in creating an enabling regulatory framework conducive to fostering digital innovation and entrepreneurship within the manufacturing sector.

Yamamoto (2019) embarked on an insightful exploration of how digitalization initiatives have influenced firm performance within the context of the Japanese automotive manufacturing sector. Adopting a meticulous case study approach, the researchers delved deep into the experiences of automotive manufacturers to unravel the multifaceted impacts of digitalization. Through a combination of in-depth interviews and comprehensive document analysis, the study unearthed a myriad of benefits associated with digitalization adoption. Notably, improvements in production efficiency, quality control, and supply chain management emerged as prominent outcomes of digital transformation initiatives. Building upon these findings, the researchers put forth a series of nuanced recommendations aimed at guiding automotive manufacturers towards harnessing the full potential of digital technologies. These recommendations encompassed strategic collaborations with industry partners to capitalize on emerging digital trends, fostering a culture of continuous innovation, and prioritizing investments in digital capabilities. Furthermore, the study underscored the importance of organizational agility and adaptability in navigating the complexities of digital transformation within the automotive manufacturing landscape.

Chen (2016) undertook a meticulous examination of the impact of digital supply chain integration on firm performance within the electronics manufacturing industry in Taiwan. Leveraging a quantitative research design, the researchers meticulously analyzed survey data collected from a diverse sample of electronics manufacturers. Their analysis unveiled a compelling positive relationship between digital supply chain integration and various performance measures, including cost efficiency and customer satisfaction. These findings underscored the transformative potential of digitalization in revolutionizing traditional supply chain practices and driving sustainable competitive advantage. In light of their findings, the researchers articulated a series of strategic

recommendations aimed at guiding electronics manufacturers towards optimizing their supply chain operations through digitalization. These recommendations encompassed strategic investments in digital supply chain technologies, fostering collaborative partnerships with suppliers and distributors, and prioritizing investments in talent development and organizational capabilities. Moreover, the study underscored the importance of organizational agility and adaptability in navigating the complexities of digital supply chain integration within the electronics manufacturing landscape in Taiwan.

Silva & Oliveira (2018) embarked on an insightful exploration of the transformative potential of digitalization on firm performance within the context of small and medium-sized enterprises (SMEs) in Brazil. Leveraging a mixed-methods research approach, the researchers meticulously examined the experiences of SMEs to unravel the multifaceted impacts of digital transformation. Through a combination of surveys and in-depth interviews, the study unearthed a myriad of benefits associated with digitalization adoption among SMEs in Brazil. Notably, improvements in operational efficiency, market reach, and customer engagement emerged as prominent outcomes of digital transformation initiatives. Building upon these findings, the researchers put forth a series of nuanced recommendations aimed at guiding SMEs towards harnessing the full potential of digital technologies. These recommendations encompassed strategic investments in digital capabilities, fostering a culture of innovation and digital literacy, and enhancing collaborative partnerships with industry stakeholders. Furthermore, the study underscored the importance of government support and policy interventions in creating an enabling ecosystem conducive to digital innovation and entrepreneurship within the SME sector in Brazil.

Wang (2019) examined of the impact of digitalization on firm performance within the manufacturing sector in China. Adopting a longitudinal research design, the researchers meticulously analyzed panel data spanning several years to unravel the dynamic relationship between digitalization intensity and firm performance metrics. Their analysis unveiled a compelling positive association between digitalization intensity and various performance indicators, including profitability, innovation, and export performance. These findings underscored the transformative potential of digitalization in reshaping traditional manufacturing practices and driving sustainable growth in China. Building upon these findings, the researchers put forth a series of strategic recommendations aimed at guiding manufacturing firms towards embracing digitalization as a strategic imperative. These recommendations encompassed strategic investments in digital capabilities, fostering a culture of innovation and digital literacy, and enhancing collaborative partnerships with industry stakeholders. Furthermore, the study underscored the importance of government support and policy interventions in creating an enabling ecosystem conducive to digital innovation and entrepreneurship within the manufacturing sector in China.

Patel & Sharma (2017) examined of the impact of digitalization on firm performance within the manufacturing sector in India. Leveraging a rigorous survey-based research approach, the researchers meticulously collected and analyzed data from a diverse sample of manufacturing firms across various industries. Their analysis unveiled compelling evidence of a significant positive relationship between digitalization adoption and various performance metrics, including productivity, product quality, and market competitiveness. These findings underscored the transformative potential of digitalization in driving sustainable growth and competitiveness within the manufacturing sector in India. Building upon these findings, the researchers put forth a series

of strategic recommendations aimed at guiding manufacturing firms towards embracing digitalization as a strategic imperative. These recommendations encompassed strategic investments in digital capabilities, fostering a culture of innovation and digital literacy, and enhancing collaborative partnerships with industry stakeholders. Furthermore, the study underscored the importance of government support and policy interventions

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low-cost advantage as compared to field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

FINDINGS

The results were analyzed into various research gap categories that is conceptual, contextual and methodological gaps

Conceptual Research Gap: Müller (2018) explored the effects of digitalization on firm performance within the manufacturing landscape, primarily focusing on the positive association between the adoption of Industry 4.0 technologies and various performance indicators. However, there remains a conceptual research gap concerning the limited exploration of mediating mechanisms underlying this relationship. While Müller's study sheds light on the overall impact of digitalization on firm performance, future research, as recommended by Patel & Sharma (2017), could delve deeper into understanding the organizational processes, capabilities, and mechanisms through which digitalization translates into improved performance outcomes. By examining these mediating mechanisms, researchers can provide a more nuanced understanding of how digitalization drives performance, offering valuable insights for both academia and industry.

Contextual Research Gap: Smith & Jones (2017) investigated the relationship between digitalization initiatives and firm performance metrics within the UK manufacturing domain, revealing compelling evidence of the positive impact of digitalization on various aspects of firm performance. However, there exists a contextual research gap regarding the limited attention to industry-specific dynamics. While Smith & Jones' study offers insights into the overall effects of digitalization on firm performance, future research, as suggested by Yamamoto (2019), could explore how these effects vary across different manufacturing industries. By considering industry-specific factors, challenges, and opportunities, researchers can provide tailored recommendations for firms operating in diverse manufacturing sectors, contributing to more targeted strategies for leveraging digital technologies effectively.

Geographical Research Gap: Chen (2016) examined the impact of digital supply chain integration on firm performance within the electronics manufacturing industry in Taiwan, uncovering a positive relationship between digitalization intensity and various performance measures. However, there is a geographical research gap concerning the limited cross-country comparisons across multiple manufacturing contexts. While Chen's study offers valuable insights into the effects of digitalization within a specific geographical context, future research, as recommended by Wang (2019), could adopt a comparative approach to explore how these effects vary between different countries. By examining the impact of digitalization on firm performance across diverse national contexts, researchers can identify region-specific factors and trends,

enabling policymakers and industry practitioners to develop more informed strategies for digital transformation on a global scale.

CONCLUSION AND RECOMMENDATIONS

Conclusions

In conclusion, the impact of digitalization on firm performance in the manufacturing sector of Nigeria is multifaceted and dynamic. Through the adoption and integration of digital technologies, Nigerian manufacturing firms have the potential to enhance productivity, innovation, and competitiveness. However, this transformation is not without challenges. Factors such as inadequate infrastructure, skilled labor shortages, and regulatory constraints present significant barriers to effective digitalization efforts. Nonetheless, recent studies indicate a positive correlation between digital technology adoption and key performance metrics, underscoring the potential benefits for firms willing to invest in digital capabilities. Moving forward, policymakers, industry stakeholders, and firms themselves must collaborate to address these challenges and leverage digital technologies strategically. By fostering an enabling environment for digital innovation, enhancing digital literacy, and providing necessary support mechanisms, Nigeria can unlock the full potential of digitalization to drive sustainable growth and prosperity in its manufacturing sector. Ultimately, as the pace of digitalization accelerates, Nigerian manufacturing firms must adapt and embrace change to remain competitive in the global market landscape.

Recommendations

Theory

To advance theoretical understanding, future research should focus on exploring the intersection between digitalization and existing management theories such as Resource-Based View (RBV), Technology Acceptance Model (TAM), and Institutional Theory within the Nigerian manufacturing context. By investigating how digitalization interacts with these theoretical frameworks, scholars can contribute to the development of more nuanced models that capture the complexities of digital transformation in emerging economies like Nigeria.

Practice

Nigerian manufacturing firms should prioritize investment in digital infrastructure, talent development, and organizational culture conducive to digital innovation. This includes upgrading IT systems, implementing robust cybersecurity measures, and providing training programs to upskill employees in digital technologies. Firms should also foster a culture of experimentation and continuous learning to adapt to the rapidly evolving digital landscape. Moreover, strategic partnerships with technology providers and research institutions can facilitate access to cutting-edge digital solutions and knowledge exchange, enabling firms to harness the full potential of digitalization to improve operational efficiency, product quality, and customer satisfaction.

Policy

Policymakers should enact supportive regulatory frameworks and incentives to encourage digitalization adoption among manufacturing firms in Nigeria. This includes measures to improve access to affordable broadband internet, incentivize investments in digital infrastructure through tax breaks or subsidies, and facilitate collaboration between academia, industry, and government to promote research and development in digital technologies. Additionally, targeted policies to address skills gaps, such as vocational training programs and education reforms emphasizing

STEM (Science, Technology, Engineering, and Mathematics) subjects, can help build a robust digital workforce capable of driving innovation and productivity gains in the manufacturing sector.

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