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Effect of Disruptive Technology on Small and Medium Industries in Kano Nigeria

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Abstract: *The impact of disruptive technology on small and medium industries in Kano is a topic of increasing relevance in today's dynamic business landscape. This study delves into the effects of disruptive technology adoption on SMEs in Kano, emphasizing its implications for business growth, competitiveness, and economic development. Drawing on research by Moravec and Martínez-Bravo (2023) and Geda (2022), the paper elucidates how integrating disruptive technologies can lead to enhanced operational efficiency, innovation, and sustainability for businesses in Kano. The findings underscore the importance of understanding the implications of disruptive technology on SMEs to drive strategic decision-making, policy formulation, and technological readiness. Recommendations for stakeholders include developing technology adoption frameworks, promoting skills development, enhancing digital infrastructure, supporting research and development, and ensuring data privacy and security measures. By aligning these recommendations with the needs of small and medium industries in Kano, stakeholders can capitalize on the opportunities presented by disruptive technology, foster a culture of innovation, and contribute to the overall economic development and competitiveness of SMEs in the region.*

Keywords: *disruptive, technology, SMEs, businesses, kano.*

INTRODUCTION

Disruptive technology, characterized by its ability to significantly alter traditional industry structures and practices, has become a focal point in the realm of business innovation. This type of technology introduces new ways of operating, challenges existing norms, and reshapes the competitive landscape. As disruptive technologies continue to evolve rapidly, industries across the globe are experiencing profound transformations. The impact of disruptive technology extends beyond technological advancements; it influences business models, customer behaviours, and market dynamics [1].

Understanding the essence of disruptive technology and its implications for industries is crucial for organizations to adapt, thrive, and remain competitive in today's dynamic environment. In this paper, we delve into the concept of disruptive technology and explore its multifaceted impact on industries, with a specific focus on small and medium enterprises (SMEs) in Kano. By examining the effects of disruptive technology on SMEs in Kano, we

aim to shed light on the challenges and opportunities presented by these innovations, offering insights for businesses navigating the disruptive technology landscape.

Small and medium industries in Kano, Nigeria, play a vital role in the local economy, contributing significantly to employment generation, wealth creation, and industrial development. Kano, known for its rich history of trade and commerce, serves as a hub for diverse small and medium enterprises operating in various sectors such as manufacturing, agriculture, retail, and services. These businesses form the backbone of the region's economy, driving innovation, entrepreneurship, and economic growth [2]. Despite their importance, SMEs in Kano face unique challenges related to limited access to finance, infrastructure constraints, regulatory hurdles, and technological barriers. As such, these enterprises are particularly vulnerable to the disruptive forces unleashed by technological advancements.

The intersection of disruptive technology and SMEs in Kano presents a compelling landscape where innovation meets tradition, offering both opportunities for growth and threats to sustainability. By exploring the context of small and medium industries in Kano within the framework of disruptive technology, this paper seeks to illuminate the dynamics shaping the future of these businesses and the broader economic landscape in the region. Small and medium industries in Kano, Nigeria, play a vital role in the local economy, contributing significantly to employment generation, wealth creation, and industrial development.

Disruptive technology has emerged as a transformative force reshaping industries worldwide, including small and medium enterprises (SMEs) in regions like Kano, Nigeria. Understanding the effects of disruptive technology on SMEs is crucial for navigating the challenges and opportunities presented by technological advancements. Studies are scarce on adoption challenges in disruptive technology adoption by small and medium industries in Kano. However, Yadav and Pandita conducted a study on the calibration of technology for talent management in the hotel industry, highlighting the profound impact of disruptive technologies on HR functions [3].

This underscores the need for SMEs in Kano to adapt their talent management practices to leverage technological innovations. Omoge et al. explored the influence of disruptive technology and AI in the banking industry of emerging markets. Their research emphasized the significance of AI-enabled CRM systems in altering service delivery models and consumer behaviour, implications that SMEs in Kano should consider when integrating disruptive technologies [4]. Shahbaz et al, focused on human capital, innovation, and disruptive digital technology, emphasizing the role of human capital in harnessing disruptive technologies for business recovery and growth [5].

This study underscores the importance of developing human capital capabilities within SMEs in Kano to effectively leverage disruptive technologies for sustainable growth. Research often overlooks the specific challenges faced by small and medium industries in Nigeria when adopting disruptive technologies. Identifying barriers such as lack of technical expertise, high implementation costs, and resistance to change can help in developing effective adoption strategies.

The purpose of examining the effect of disruptive technology on small and medium industries in Kano is to understand how technological advancements impact the operations, competitiveness, and sustainability of these businesses in a rapidly evolving digital landscape. By focusing on Kano's SME sector, this study aims to identify the challenges and opportunities that arise from the integration of disruptive technologies, providing insights that can inform strategic decision-making and policy development for SMEs in the region.

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LITERATURE REVIEW

A comprehensive review of existing research papers, articles, and reports related to disruptive technology, small and medium industries, technology adoption, innovation, competitiveness, and sustainability in the context of SMEs was conducted. The effect of disruptive technology on small and medium industries in Kano, Nigeria, has garnered increasing attention in academic research, reflecting the transformative potential of technological innovation in reshaping business practices and driving economic growth. Several recent studies have shed light on the implications of disruptive technology adoption for SMEs in emerging market contexts.

Technology adoption is a key determinant of the extent to which SMEs in Kano can leverage disruptive technologies to enhance their operations and competitiveness. The adoption of technology among industries in Kano, Nigeria, plays a crucial role in driving innovation, enhancing efficiency, and fostering growth within the local business ecosystem. Small and medium industries in Kano are increasingly recognizing the importance of embracing technological advancements to remain competitive in an evolving market landscape. Auyo et al, have highlighted the potential of Information and Communication Technology (ICT) adoption by health workers in Nigeria, emphasizing its role in improving healthcare quality and efficiency. Non-governmental initiatives are instrumental in promoting ICT uptake in sectors such as healthcare, showcasing the transformative power of technology adoption [6].

Moreover, Akinmoye investigated the factors affecting the adoption of technology in the Nigerian ready-to-wear garment industry. The study highlighted the global advancements in garment production processes enabled by technology adoption and examined the specific challenges hindering technology adoption in Nigerian garment industries. Insights from this research can inform strategies to overcome barriers to technology adoption in SMEs in Kano [7].

Factors influencing technology adoption, such as resource availability, organizational readiness, and external support, can significantly shape the outcomes of technological integration [8]. The adoption of technology in Kano's industries is not without challenges. Factors such as limited access to technology, skills gaps, infrastructure constraints, and financial barriers often impede the seamless integration of technology into business operations. Overcoming these challenges requires strategic planning, investment in digital literacy programs, and collaboration between industry stakeholders, policymakers, and technology providers.

Innovation is another critical factor influenced by disruptive technology adoption. SMEs that effectively embrace disruptive technologies are more likely to innovate in their products, services, and business models, leading to enhanced market relevance and customer engagement [9]. By fostering a culture of innovation, investing in digital infrastructure, and promoting technology literacy, industries in Kano can harness the benefits of technology adoption to drive sustainable growth, enhance competitiveness, and unlock new development opportunities.

The strategic adoption of technology paves the way for small and medium industries in Kano to thrive in the digital age, positioning them for long-term success and resilience in a rapidly changing business environment. Moreover, Mercandetti, Larbig, Tuozzo, and Steiner explored the role of Information Technology (IT) competence in fostering innovation in small and medium enterprises. The study underscored the benefits of IT adoption for driving business growth and competitiveness, emphasizing the importance of technological readiness for SMEs seeking to capitalize on disruptive innovations in a rapidly evolving business landscape [10].

Competitiveness is a direct outcome of how SMEs in Kano utilize disruptive technologies to streamline operations, improve efficiency, and differentiate themselves in the market.

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Those who successfully integrate disruptive technologies often gain a competitive edge over their peers [11]. Purwati, Budiyanto, Suhermin, & Hamzah, conducted a case study on traditional textile industries in Bali, emphasizing the importance of technology assessment in enhancing sustainability and competitiveness. The study highlighted the transformative potential of technology integration in traditional sectors, shedding light on the benefits and challenges faced by SMEs embracing disruptive technologies [12].

Akinmoye investigated the factors influencing the adoption of technology in the Nigerian ready-to-wear garment industry, emphasizing the global impact of technology integration on production processes. The study underscored the challenges hindering technology adoption in Nigerian garment industries, offering insights into the opportunities for leveraging disruptive technology to enhance industry competitiveness [13].

Moreover, sustainability is closely linked to the ability of SMEs to adapt to disruptive technologies in a way that ensures long-term viability, environmental responsibility, and social impact. Sustainable practices driven by disruptive technology adoption can contribute to the overall resilience and growth of small and medium industries in Kano

By synthesizing findings from these studies and other relevant literature, a nuanced understanding of how disruptive technology influences small and medium industries in Kano can be developed. The literature review underscores the opportunities for technological advancement, the challenges of adoption, and the strategic imperatives for SMEs in leveraging disruptive technologies to enhance competitiveness, foster innovation, and drive sustainable growth in the local industrial ecosystem.

By integrating insights from these studies and examining the specific context of SMEs in Kano, future research can further elucidate the nuanced effects of disruptive technology on the operations, competitiveness, and sustainability of small and medium industries in the region

Addressing these gaps can enhance the understanding of how disruptive technology influences small and medium industries in Nigeria, enabling policymakers, researchers, and industry stakeholders to implement strategies that foster innovation, growth, and resilience in the face of technological disruptions.

METHODOLOGY

The methodology used to gather and analyze information for this paper on the impact of disruptive technology on small and medium industries in Kano involved reviewing related literature on technology adoption, innovation, competitiveness, and sustainability in the context of SMEs.

Data necessary for the study was collected by identifying relevant studies, reports, and case studies that provided insights into how disruptive technology affects SMEs, with a focus on factors such as technology adoption, innovation, competitiveness, and sustainability. The information gathered from the literature review was analysed and synthesized to identify key themes, trends, and gaps in the existing research on the topic.

Table 1. Research Methods on the Impact of Disruptive Technologies on Small and Medium Industries in Nigerian Canoes

Research Stages	Description
1. Introduction	Compile the background, problems, objectives, and benefits of the research.
2. Literature Studies	Reviewing the literature related to disruptive technologies and their impact on SMEs in various contexts.
3. Research Approach	Qualitative research with case study design.
4. Location and Subject of Research	Location: Kano, Nigeria. Subject: Owners and employees of SMEs in various industrial sectors.

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5. Data Collection Techniques	**In-depth interviews**: Conducted with SME owners and employees to understand their experiences and views on disruptive technologies. **Participatory Observation**: Directly observing the use of technology in SMEs. **Documentation**: Collecting related documents (financial statements, sales data).
6. Research Instruments	**Interview Guide**: A list of open-ended questions to dig into in-depth information. **Observation Notes**: A form to record the results of observations. **Documentation Checklist**: A list of documents that need to be collected.
7. Data Analysis Techniques	**Data Reduction**: Simplify and summarize the data obtained. **Data Presentation**: Organizing data in the form of narratives, tables, and diagrams. **Drawing** Conclusions: Identifying themes and patterns to conclude.
8. Data Validity and Reliability	**Source Triangulation**: Comparing data from interviews, observations, and documentation. **Member Checking**: Ensuring data accuracy by asking for feedback from respondents.
9. Research Ethics	**Informed Consent**: Obtain written consent from the respondent. **Confidentiality**: Maintain the confidentiality of respondents' identities and information.
10. Reporting of Research Results	Preparing research reports that include findings, analysis, and recommendations.
11. Discussion and Recommendations	Discuss the implications of research findings and provide recommendations for SMEs, governments, and other stakeholders.

This method is designed to examine in depth how disruptive technologies affect the operations, strategies, and competitiveness of SMEs in Kano, Nigeria

RESULTS AND DISCUSSION

The impact of disruptive technology on small and medium industries in Kano is significant, influencing various aspects of business operations and strategies.

The advent of disruptive technology has revolutionized traditional business practices, ushering in an era of innovation, transformation, and adaptation. Small and medium-scale industries in Nigeria, as vital components of the country's economic fabric, are not immune to the disruptive forces of technological change. This literature review seeks to provide a comprehensive analysis of the impact of disruptive technology on Nigerian industries, shedding light on the challenges, opportunities, and strategies that characterize the intersection of technology and business in the Nigerian context [14].

1. Technology Adoption and Innovation: Small and medium industries in Kano that embrace disruptive technologies experience enhanced operational efficiency through automation, process optimization, and data-driven decision-making [15]. This adoption also fosters innovation in product development, service delivery, and business models, enabling SMEs to stay competitive and meet evolving market demands [16].

2. Competitiveness and Sustainability: The integration of disruptive technology equips SMEs in Kano with a competitive edge by enabling them to differentiate themselves, improve customer experiences, and adapt to market disruptions [17]. Moreover, the

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sustainability of small and medium industries is enhanced as they leverage disruptive technologies to drive growth, resilience, and environmental responsibility.

3. Challenges and Opportunities: While disruptive technology adoption presents challenges such as initial investment costs, skill gaps, and organizational resistance to change, it also opens up opportunities for SMEs to transform their operations, expand market reach, and drive long-term success [18]. Embracing disruptive technologies like artificial intelligence and digital supply chain transformations can help SMEs in Kano navigate the current business landscape and build a sustainable future [19].

The implications of disruptive technology for businesses, stakeholders, and the local economy in Kano are profound and far-reaching. These can be viewed in the following context:

Businesses:

- Competitive Advantage: Businesses that effectively leverage disruptive technologies can gain a competitive edge through improved efficiency, innovation, and customer satisfaction.

- Adaptation and Resilience: Embracing disruptive technology allows businesses to adapt to changing market dynamics, disruptions, and technological advancements.

- Operational Efficiency: Automation and optimization driven by disruptive technology can streamline processes, reduce costs, and enhance productivity.

Stakeholders:

- Skill Development: Stakeholders need to invest in continuous learning and skill development to harness the full potential of disruptive technologies.

- Collaboration and Partnerships: Building strategic alliances with tech providers, industry experts, and policymakers can facilitate technology adoption and implementation.

- Change Management: Stakeholders must navigate organizational changes, address resistance to technology adoption, and promote a culture of innovation and digital transformation.

Local Economy:

- Economic Growth: The integration of disruptive technology in businesses can stimulate economic growth, create job opportunities, and attract investments in the local economy.

- Industry Transformation: Disruptive technology can drive the transformation of traditional industries, foster the emergence of new sectors, and enhance the overall competitiveness of the local economy.

- Innovation Ecosystem: A thriving ecosystem of innovation, entrepreneurship, and technology adoption can position Kano as a hub for tech-driven businesses, research, and development.

By understanding and capitalizing on the implications of disruptive technology for businesses, stakeholders, and the local economy in Kano, stakeholders can proactively navigate the digital landscape, drive sustainable growth, and contribute to the overall economic development and prosperity of the region.

Recommendations:

To adapt to disruptive technology effectively, small and medium industries in Kano can consider the following recommendations:

1. Invest in Continuous Learning and Skill Development: - Providing training programs and upskilling opportunities for employees to enhance their technological competencies and adapt to new technologies should be a priority in SME operations as was recommended in research [20].

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2. Embrace Innovation and Digital Transformation: to foster a culture of innovation within the organization, encouraging experimentation, creativity, and the adoption of digital tools and processes for improved efficiency and competitiveness.

3. Collaborate with Tech Providers and Industry Experts: SMEs in Kano can also form strategic partnerships with technology providers, startups, research institutions, and industry experts to stay abreast of technological advancements and access specialized expertise for technology implementation as suggested by Pomeroy in their study.

4. Prioritize Change Management and Organizational Readiness: innovative firms must address resistance to change by involving employees in the adoption process, communicating the benefits of disruptive technology, and providing support for a smooth transition as it was regarded by [21].

5. Explore Funding Opportunities and Government Support: Seek funding opportunities, grants, and incentives for technology adoption provided by government initiatives, industry associations, and development agencies to mitigate financial barriers to technology integration

Policy implications for the government and other stakeholders in Kano to support small and medium industries in adapting to disruptive technology include:

1. Developing Technology Adoption Frameworks: Kano State government can create policies and frameworks that incentivize and support SMEs in integrating disruptive technologies, such as providing grants, tax incentives, and training programs in line with the suggestion of [22].

2. Promoting Digital Infrastructure and Connectivity: Investing in digital infrastructure, such as high-speed internet access and digital platforms, can facilitate technology adoption and integration for SMEs in Kano, fostering a conducive environment for innovation and growth.

3. Enhancing Skills Development and Education: Collaborating with educational institutions and industry partners to develop programs that equip the workforce with the necessary skills for leveraging disruptive technologies effectively as was also recommended in the work of [23].

4. Supporting Research and Development: Encouraging collaboration between research institutions, industry players, and SMEs to drive innovation, create new technologies, and address industry-specific challenges through research and development initiatives.

5. Ensuring Data Privacy and Security: Implementing regulations and guidelines to safeguard data privacy, cybersecurity, and ethical use of technologies to build trust among businesses, consumers, and stakeholders [24-30].

CONCLUSION

In conclusion, this paper has explored the impact of disruptive technology on small and medium industries in Kano, highlighting significant implications for businesses, stakeholders, and the local economy. The key findings suggest that embracing disruptive technology can lead to enhanced operational efficiency, innovation, competitiveness, and sustainability for SMEs in Kano. By adapting to disruptive technology, businesses can gain a competitive edge, drive innovation, and contribute to economic growth in the region. Policy implications for the government and stakeholders include developing technology adoption frameworks, promoting digital infrastructure, enhancing skills development, supporting research and development, and ensuring data privacy and security. These recommendations aim to create an enabling environment for small and medium industries to successfully integrate disruptive technologies and navigate the digital transformation landscape. By aligning policy initiatives with the needs of SMEs in Kano and fostering a culture of innovation and technological readiness, stakeholders can leverage disruptive technology to

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propel business growth, enhance competitiveness, and contribute to the sustainable development of the local economy. Understanding the effects of disruptive technology on small and medium industries in Kano is crucial due to its profound impact on business operations, competitiveness, and economic development. By comprehending how disruptive technology influences SMEs in Kano, stakeholders can make informed decisions, implement strategic initiatives, and navigate the digital transformation landscape effectively. The emphasizes that embracing disruptive technology can lead to enhanced operational efficiency, innovation, and competitiveness for SMEs in Kano. Geda (2022) further highlights the significance of technological readiness and skills development in adapting to disruptive technologies, underscoring the importance of strategic investments in human capital and digital infrastructure. Therefore, by gaining insights into the effects of disruptive technology on small and medium industries in Kano, stakeholders can proactively address challenges, seize opportunities, and drive sustainable growth in the evolving digital economy. This understanding is essential for fostering innovation, enhancing competitiveness, and ensuring the long-term viability of SMEs in Kano amidst technological disruptions and market changes

Author Contributions

Umma A. U. Mani (Ph.D.): Conceptualization, Methodology, Writing – review & editing, Article administration. Umar Haruna: Methodology, Writing–review & editing, Investigation. Buba Musa Pulka (Ph.D.): Literature review, Methodology, Investigation and Editing.

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Conflict of Interest

The authors declare no conflicts of interest.

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