
EMPOWERING SMALL BUSINESSES: THE ROLE OF AI IN NIGERIA'S RETAIL INDUSTRY

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Abstract: This study examines the integration of Artificial Intelligence (AI) in the decision-making processes of Small and Medium Enterprises (SMEs) in Nigeria's retail sector, focusing on its applications, benefits, challenges, and future prospects. Using a descriptive research design, data was collected through a Google Forms survey from 100 SME decision makers. The findings reveal that while 70% of SMEs have adopted AI to some extent, only 20% have fully integrated it into their operations, with customer behavior analysis (60%) and inventory management (50%) being the most common applications. AI adoption has led to improved decision-making (65%) and enhanced operational efficiency (60%), yet significant barriers such as high implementation costs (70%) and a lack of technical expertise (65%) hinder wider adoption. Despite these challenges, 80% of respondents expressed interest in expanding AI usage in areas such as advanced customer analytics and supply chain optimization. The study concludes that while AI presents immense opportunities for SMEs to enhance competitiveness against larger ecommerce platforms, addressing financial, technical, and infrastructural barriers is crucial for wider adoption. It recommends affordable AI solutions, targeted training programs, improved financing options, policy support, and strategic partnerships to facilitate AI integration and long-term sustainability in Nigeria's retail industry.

Keywords: AI Optimization, Decision-Making, Small and Medium Enterprises (SMEs), Retail Industry, Business Intelligence, Nigeria.

INTRODUCTION

The global retail industry is experiencing a revolution with artificial intelligence (AI) emerging as an innovation-driven driver of strategic decision-making (Rashid & Kausik, 2024). With AI, companies have available to them the technology that can process large amounts of data, forecast trends, automate processes, and improve customer experience (Haleem et al., 2022). Though large internet marketplaces such as Amazon, Alibaba, and Jumia utilize AI in aggregating competitive advantages, Nigerian Small and Medium Enterprises (SMEs) in the retail sector are finding the use of AI as a way to enhance their decision-making ability (Udeogu & Okoye, 2024). Implementing AI, however, is a complex process for SMEs due to such limitations as unavailability of resources, requisite technical competencies, and infrastructural barriers. Despite these constraints, SMEs' custom AI solutions will be able to put the playing field level and enable such companies to compete in the increasingly digital economy (Peretz-Andersson et al., 2024). The Nigerian retail industry is an important and dynamic segment of the nation's economy, where SMEs constitute a significant proportion of this industry (Adeosun & Shittu,

2021). Such firms have a role of being the middlemen in the linkages between producers and consumers, positioning products and services in rural as well as urban markets. Nigerian retailing, however, remains highly fragmented with SMEs constantly competing with existing e-commerce platforms that employ state-of-the-art AI-based practices in inventory control, focused advertising, and client care (Oladimeji, 2023). The growing retail digitalization, fueled by growing internet penetration and mobile phone usage, underscores the imperative for SMEs to embrace AI as a tool for strategic choice and organizational efficiency (Vhatkar et al., 2024). This study aims to examine how Nigerian SMEs in the retail industry are using AI in decision-making, with a focus on opportunities, challenges, and implications. By analyzing the application of AI in all key sectors such as customer behavior analysis, inventory management, and demand forecasting, the study seeks to identify the extent to which these companies are applying AI to keep pace with large e-commerce sites. In addition, it examines the barriers hindering wider AI adoption and offers recommendations to bridge the gap so that SMEs can access the full potential of AI in driving growth and sustainability in the retail sector.

LITERATURE REVIEW

Overview of Small and Medium Enterprises (SMEs) in Nigeria's Retail Sector

Small and Medium-sized Enterprises (SMEs) are an imperative driving force of the Nigerian economy, responsible for massive employment generation, poverty alleviation, and economic growth (Adeosun & Shittu, 2021). According to the National Bureau of Statistics (NBS), SMEs comprise over 96% of business establishments in Nigeria, accounting for nearly 49% of Nigeria's Gross Domestic Product (GDP) (Kempis & Ogden, 2023). The retail sector, in particular, is an important part of the SME world, with various categories such as grocery shops, fashion shops, and electronics outlets. These entities are predominantly informal, with businesses characterized by low scalability, labor-intensive processes, and low adoption of technology (Oby et al., 2021). While important, Nigerian SMEs are bedeviled by various challenges, including inadequate access to finance, poor infrastructure, and intense competition from larger organizations, particularly in the digital and e-commerce sectors (Obe, 2025). Moreover, the development of e-commerce platforms like Jumia and Konga has upset traditional retailing practices by offering consumers convenience, competitive prices, and diversified product choices (Alexander & Andreas, 2022). In order to stay competitive, SMEs in the retail industry in Nigeria are starting to tap into digital transformation approaches, with artificial intelligence (AI) as an exciting new tool for maximizing decision-making and improving operational effectiveness (Omowole et al., 2024).

Artificial Intelligence in Business Decision-Making

Artificial intelligence refers to the simulation of human intelligence by means of machines possessing the capability of thinking, learning, and deciding. AI technology encompasses a vast array of applications including machine learning (ML), natural language processing (NLP), and predictive analytics (Collins et al., 2021). AI tools enable organizations to analyze voluminous amounts of data, render repetitive tasks meaningless, and provide actionable insights. In business decisions, AI is usable in topics such as forecasting demand, management of inventory, customer segmentation, and

marketing towards targeted audiences (Haleem et al., 2022). AI grants SMEs special prospects to close the competitive deficit against large organizations. Research has proved that AI enhances efficiency, saves money, and boosts the quality of the customer experience. For instance, predictive analytics allows businesses to forecast demand correctly, reducing instances of overstocking or stockout (Kumar et al., 2024; Buehler, 2024). Similarly, chatbots and AI-based recommendation systems help SMEs provide personalized customer support and product suggestions, improving customer loyalty and satisfaction (Hariguna & Ruangkanjanases, 2024). Yet the integration of AI into business must have a good environment to be successful, such as access to digital infrastructure, human resources with the right expertise, and capital (Haefner et al., 2023).

The Adoption of AI in Nigeria's Retail Sector

AI adoption in Nigeria's retail sector is still in its nascent stages, with many SMEs yet to fully embrace the technology. This lag can be attributed to several factors, including low awareness of AI's potential benefits, high implementation costs, and a lack of technical expertise (Ebuka et al., 2023; Edward & Oguh, 2024). Nonetheless, there are notable instances of AI adoption among forward-thinking SMEs, particularly in urban center like Abuja (Joshua et al., 2024). These enterprises leverage AI tools for functions such as sales forecasting, customer relationship management (CRM), and fraud detection. Research by Edward & Oguh (2024) highlights the potential of AI to transform Nigeria's retail sector by enabling SMEs to make data-driven decisions. The study found that SMEs in Edo State Nigeria that adopted AI technologies reported a 25% increase in operational efficiency and an improvement in customer satisfaction. However, the study also identified barriers to AI adoption, including inadequate digital literacy, high implementation costs, and limited access to reliable internet connectivity.

AI Applications in Key Decision-Making Areas for SMEs

Customer Behavior Analysis

Understanding customer behavior is critical for SMEs in the retail sector to tailor their offerings and improve customer retention (Stanca et al., 2023). AI-powered tools such as sentiment analysis, customer segmentation, and predictive modeling enable businesses to analyze customer data and identify patterns in purchasing behavior. For example, machine learning algorithms can analyze historical sales data to predict future trends, allowing SMEs to anticipate customer needs and adjust their strategies accordingly (Kumar et al., 2024). One practical application is the use of AI-driven recommendation systems, which suggest products based on a customer's browsing history and preferences. Such systems, commonly employed by large e-commerce platforms, are now becoming accessible to SMEs through affordable AI software solutions (Kumar et al., 2024). By adopting these tools, SMEs can enhance customer experiences, increase sales, and build brand loyalty.

Inventory Management

Efficient inventory management is a major challenge for SMEs, often resulting in overstocking or stockouts that can lead to financial losses. AI can help address this issue by providing real-time inventory tracking, demand forecasting, and automated reordering systems (Abbey et al., 2024). For instance, AI algorithms can analyze historical sales data, seasonal trends, and market conditions to

predict demand accurately. This enables SMEs to optimize stock levels, reduce waste, and improve cash flow management. Moreover, AI-powered inventory systems can integrate with point-of-sale (POS) platforms, providing SMEs with a holistic view of their operations. Such systems also enable businesses to monitor inventory turnover rates, identify slow-moving products, and make informed decisions about pricing and promotions (Joel et al., 2024). Studies have shown that SMEs that adopt AI for inventory management experience a 20-40% reduction in holding costs and a significant improvement in order fulfillment rates (Peretz-Andersson et al., 2024; Kukreja, 2025).

Marketing and Customer Engagement

Marketing is another critical area where AI can enhance decision-making for SMEs. AI tools such as chatbots, social media analytics, and email marketing platforms enable businesses to engage with customers more effectively and at scale (Madanchian, 2024). Chatbots, for instance, provide 24/7 customer support, answering queries and guiding customers through the purchasing process. Social media analytics tools allow SMEs to monitor customer sentiment, track campaign performance, and identify emerging trends (Madanchian, 2024; Kumar et al., 2024). Personalized marketing is particularly impactful, as it enables SMEs to tailor their messaging to individual customers based on their preferences and behavior. AI-powered email marketing platforms, for example, can segment customers into different categories and send targeted promotions, resulting in higher engagement rates and conversions (Babatunde et al., 2024). By leveraging AI for marketing, SMEs can compete more effectively with larger players, build stronger customer relationships, and increase brand visibility.

Barriers to AI Adoption Among SMEs in Nigeria

Cost and Financial Constraints

The high cost of AI implementation is a significant barrier for SMEs in Nigeria. Many AI solutions require substantial upfront investments in hardware, software, and training, which are often beyond the financial capacity of small businesses (Bala et al., 2024). Additionally, the lack of affordable financing options exacerbates the challenge, leaving many SMEs unable to adopt AI despite its potential benefits. **Limited Digital Infrastructure**

Nigeria's digital infrastructure is still underdeveloped, with many regions lacking reliable internet connectivity and access to electricity. These challenges hinder the adoption of AI technologies, particularly in rural areas where SMEs are already at a disadvantage (Okoye & Uchenna, 2023). Without a robust digital ecosystem, the integration of AI into business operations becomes impractical.

Low Levels of Digital Literacy

Digital literacy is another critical barrier, as many SME owners and employees lack the technical skills needed to implement and manage AI solutions. Training programs and capacity-building initiatives are essential to bridge this knowledge gap, enabling SMEs to harness the potential of AI effectively (Iyelolu et al., 2024).

Regulatory and Ethical Concerns

The regulatory environment in Nigeria poses additional challenges for AI adoption. Issues such as data privacy, cybersecurity, and ethical considerations must be addressed to build trust and confidence in

AI technologies. The absence of clear guidelines and policies on AI use further complicates the adoption process for SMEs (Ebenibo et al., 2024).

Strategies for Promoting AI Adoption Among SMEs

To shatter the barriers to AI adoption among Nigerian retail SMEs, there needs to be a multifaceted approach. Among the most crucial steps involves government support and incentives. The government can emerge as an important catalyst to enhance AI adoption by offering financial incentives, grants, and subsidies that lower the cost burden on SMEs (Iyelolu et al., 2024). Besides, encouraging public-private partnerships can drive the development of basic digital infrastructure and upskilling programs. By investing in AI-enabling policies and financing support mechanisms, the government can put in place an enabling environment that will encourage SMEs to enter into and implement AI technologies in their firms (Abu et al., 2024). The second primary strategy is developing affordable AI solutions that meet the needs and budget constraints of SMEs. The majority of small businesses are confronted with the challenge of expensive and technical complexity in integrating AI-driven tools. In order to surmount this challenge, technology suppliers should create cost-effective and scalable AI software, for instance, cloud services, which reduce the requirement for a huge up-front investment in hardware and software (Füller et al., 2022). By offering flexible payment plans and simple-to-use AI tools, SMEs can conveniently adopt AI in their business functions without having to bear too much cost. Secondly, capacity building and training sessions are critical to equipping SMEs with the skills and expertise required to use AI effectively. The majority of SMEs lack the technical expertise required to adopt and implement AI technologies, and thus training and education are essential components of AI adoption (Badghish & Soomro, 2024). Organizing training programs, workshops, and certification courses can enhance digital literacy of SME owners and employees. Collaborations with universities, tech firms, and industry experts can further enhance the training programs, ensuring that SMEs gain practical exposure and first-hand experience of AI applications. A definite policy and regulatory framework is also necessary to guide AI adoption in the SME sector. The government has to formulate clear policies and guidelines on major concerns such as data privacy, cybersecurity, and ethical considerations of AI adoption (Marwa Samih Soudi & Merja Bauters, 2024). With regulatory requirements, the government can persuade SMEs and consumers to believe that AI will be adopted in a safe and responsible manner. A definitive legal framework will not only protect consumers and businesses but also encourage more SMEs to embrace AI without fear of legal uncertainties.

METHODOLOGY

Research Design

This study adopts a descriptive research design to examine how small and Medium Enterprises (SMEs) in Nigeria's retail sector are integrating Artificial Intelligence (AI) into their decision-making processes. A descriptive design is appropriate as it enables the collection and analysis of data to describe existing conditions, trends, and practices among SMEs. The research focuses on gathering data on AI adoption, its impact on decision-making, and the challenges SMEs face. The design allows for an in-depth

exploration of the current state of AI usage in the sector without manipulating the study variables.

Population and Sample

The population for this study comprises SMEs operating within Nigeria's retail sector, including businesses engaged in the sale of consumer goods, groceries, fashion, electronics, and other essential retail products. The study specifically targets decision-makers, such as business owners, managers, and senior executives, as they are directly involved in adopting and implementing AI solutions in their operations. The sampling technique used is purposive sampling, where respondents are selected based on their relevance to the research objectives. The sample size consists of 100 SMEs, representing a diverse range of retail businesses across urban and semi-urban areas of Nigeria. This sample size ensures adequate representation and provides sufficient data to draw meaningful conclusions about AI integration in the sector.

Data Collection

Data for the study is collected through an online survey using Google Forms. The survey instrument comprises structured questions designed to gather both quantitative and qualitative data. The questionnaire is divided into sections addressing key research areas, including the level of AI adoption, the specific applications of AI in decision-making, the perceived benefits and challenges, and the future outlook for AI integration. The survey is disseminated via email and social media platforms to maximize outreach and participation. To ensure the reliability and validity of the data collection process, the questionnaire is pretested with a small group of SMEs before full deployment. Feedback from the pre-test is used to refine the questions and ensure clarity, relevance, and alignment with the study's objectives.

Data Analysis

The data collected through Google Forms is analyzed using a combination of descriptive and inferential statistical methods. Descriptive statistics, such as frequencies, percentages, and mean values, are used to summarize and present the data in a clear and concise manner. Charts and tables are employed to visualize patterns and trends (Kaliyadan & Kulkarni, 2019). For qualitative responses, thematic analysis is applied to identify recurring themes and insights related to AI adoption and its impact on decision-making. The data is processed using statistical software (e.g., Microsoft Excel or SPSS) to ensure accuracy and facilitate in-depth analysis. The findings are then interpreted in the context of existing literature to provide a comprehensive understanding of the role of AI in optimizing decision-making for SMEs in

Nigeria's retail sector.

Ethical Considerations

This study adheres to strict ethical guidelines to ensure the rights and privacy of all participants are protected. Participation in the survey is voluntary, and respondents are informed about the purpose of the study, their right to withdraw at any stage, and how their data will be used. A consent statement is included at the beginning of the survey, and participants must explicitly agree before proceeding. The data collected is anonymized to protect the identities of the respondents and is stored securely to

prevent unauthorized access. The study complies with ethical standards for research involving human subjects and ensures transparency, confidentiality, and integrity throughout the research process.

RESULTS

This section presents the findings from the survey conducted to examine the integration of Artificial Intelligence (AI) in the decision-making processes of SMEs in Nigeria’s retail sector. The results are based on responses collected from 100 SME decision-makers via Google Forms. The findings are organized into key themes, with tables and charts included to present the data effectively.

Demographic Profile of Respondents

Table 1 summarizes the demographic characteristics of the respondents, including their roles in the business, years of experience, and location of operations.

Table 1

Demographic Variables

Demographic Variable	Category	Frequency	Percentage (%)
Role in the Business	Owner/CEO	50	50
	Manager	35	35
	Supervisor	15	15
Years of Experience	Less than 5 years	40	40
	5–10 years	45	45
	More than 10 years	15	15
Location of Operations	Urban	70	70
	Semi-urban	30	30

The data shows that the majority of respondents (50%) are business owners or CEOs, while managers account for 35%. Most respondents (85%) have over five years of experience in the retail sector, with a significant portion operating in urban areas (70%).

Level of AI Adoption Among SMEs

The survey sought to determine the level of AI adoption in the decision-making processes of SMEs.

Table 2

Proportion of Businesses that have Integrated AI into their Operations.

AI Adoption Status	Frequency	Percentage (%)
Fully adopted AI	20	20%
Partially adopted AI	50	50%
No adoption	30	30%

The findings reveal that 70% of respondents have adopted AI to some extent, with 20% reporting full adoption. However, 30% of SMEs have yet to integrate AI into their decisionmaking processes.

AI Applications in Retail Decision-Making

Respondents were asked about the specific areas where AI is being applied within their businesses.

Table 3

Results

AI Application Area	Frequency	Percentage (%)
Customer behavior analysis	60	60
Inventory management	50	50
Demand forecasting	45	45
Marketing and promotions	40	40
Personalized customer service	30	30

The data indicates that customer behavior analysis (60%) and inventory management (50%) are the most common areas of AI application. Demand forecasting (45%) and marketing/promotion (40%) are also notable areas where AI is being leveraged. Personalized customer service is less commonly implemented, with only 30% of respondents using AI in this area.

Perceived Benefits of AI Integration

Table 4

Key Benefits of AI Adoption as Reported by the Respondents.

Perceived Benefit	Frequency	Percentage (%)
Improved decision-making	65	65
Enhanced operational efficiency	60	60
Better customer engagement	50	50
Increased sales and revenue	45	45
Competitive advantage	40	40

The majority of respondents (65%) reported that AI has improved their decision-making processes. Enhanced operational efficiency (60%) and better customer engagement (50%) are also widely acknowledged benefits. Additionally, 45% of SMEs have experienced increased sales and revenue due to AI adoption.

Challenges of AI Adoption

Respondents were asked to identify the challenges they face in integrating AI into their businesses.

Table 5

Findings

Challenge	Frequency	Percentage (%)
High cost of implementation	70	70
Lack of technical expertise	65	65
Limited access to AI tools	55	55
Resistance to change	40	40

Poor infrastructure	35	35
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The findings reveal that the high cost of implementation (70%) and lack of technical expertise (65%) are the most significant barriers to AI adoption. Limited access to AI tools (55%) and resistance to change (40%) are additional challenges reported by respondents.

Future Outlook for AI Integration

When asked about their plans for AI adoption, 80% of respondents expressed interest in increasing their use of AI in the near future.

Table 6

Highlights the Areas where SMEs Intend to Expand their AI Usage.

Planned AI Application	Frequency	Percentage (%)
Advanced customer analytics	70	70
Supply chain optimization	60	60
Real-time inventory tracking	50	50
Automated marketing campaigns	45	45
Chatbots for customer support	40	40

The data suggests that advanced customer analytics (70%) and supply chain optimization (60%) are the primary focus areas for future AI integration.

Discussion of Findings

The findings of this study reveal significant insights into the integration of Artificial Intelligence (AI) by SMEs in Nigeria's retail sector. A key observation is that while 70% of respondents have adopted AI to some extent, only 20% have fully integrated it into their decision-making processes. This demonstrates a growing awareness of AI's potential among SMEs but also highlights the uneven levels of adoption. Many SMEs are still in the exploratory phase, leveraging AI partially in select areas such as customer behavior analysis and inventory management. This trend aligns with global patterns where SMEs, despite resource constraints, are increasingly embracing AI as a means of staying competitive in a digitalized economy (Carayannis et al., 2025) Customer behavior analysis and inventory management emerged as the most common applications of AI, with 60% and 50% of respondents respectively utilizing AI in these areas. This suggests that SMEs are prioritizing areas where AI can directly influence operational efficiency and customer satisfaction. By leveraging AI-driven insights into purchasing patterns and stock levels, SMEs can make data-informed decisions, reduce waste, and enhance service delivery. However, less emphasis on personalized customer service (30%) indicates that SMEs might not yet fully appreciate the long-term value of AI in creating tailored customer experiences, a strategy that larger e-commerce platforms have successfully employed to retain customer loyalty. Despite the evident benefits, such as improved decision-making (65%) and enhanced operational efficiency (60%),

significant barriers to AI adoption persist. The high cost of implementation was identified as the most pressing challenge, affecting 70% of respondents. This finding underscores the financial constraints faced by SMEs in Nigeria, many of which operate on limited budgets. Additionally, the lack of technical expertise (65%) and limited access to AI tools (55%) highlight systemic issues that need to be addressed to enable widespread AI adoption. These challenges mirror those reported in other developing economies, where infrastructural gaps and resource limitations hinder the full utilization of emerging technologies (Adebayo & Adeniyi, 2021).

Encouragingly, 80% of respondents expressed interest in expanding their AI usage in the future, with a focus on advanced customer analytics (70%) and supply chain optimization (60%). This suggests a forward-looking mindset among SMEs, recognizing AI as a strategic tool for growth. However, realizing these aspirations will require targeted interventions, including affordable AI solutions, training programs, and supportive government policies. By addressing the existing barriers and fostering a conducive environment for technological adoption, SMEs in Nigeria's retail sector can leverage AI not only to compete with larger ecommerce platforms but also to drive innovation and sustainability in the industry.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study has provided valuable insights into the integration of Artificial Intelligence (AI) in the decision-making processes of SMEs in Nigeria's retail sector. The findings indicate that AI adoption is gaining traction among SMEs, with 70% of respondents having adopted AI in some capacity. However, the level of integration remains limited, with only 20% reporting full adoption. This highlights the significant potential for growth in AI utilization among SMEs. Key areas of AI application, such as customer behavior analysis and inventory management, demonstrate that SMEs are prioritizing operational efficiency and data-driven decision-making to remain competitive. While SMEs are beginning to experience the benefits of AI, such as improved decisionmaking and enhanced operational efficiency, substantial challenges hinder wider adoption. The high cost of AI implementation and a lack of technical expertise are the most significant barriers. These challenges underscore the financial and capacity constraints faced by SMEs, particularly in developing economies like Nigeria, where infrastructural gaps further complicate technological integration. The limited adoption of AI for personalized customer experiences also suggests that SMEs may not yet fully exploit AI's potential to enhance customer engagement and loyalty. Despite these challenges, the study reveals a strong willingness among SMEs to expand their use of AI in the future, particularly in areas such as advanced customer analytics and supply chain optimization. This optimism reflects the growing recognition of AI as a tool for driving business growth and competitiveness in an increasingly digitalized retail landscape. However, achieving this vision will require targeted interventions to address the systemic barriers that hinder SMEs from fully leveraging AI.

Recommendations

To enable SMEs in Nigeria's retail sector to maximize the potential of AI, the following recommendations are proposed:

- i. **Affordable AI Solutions:** Technology providers should develop affordable AI tools tailored to the unique needs and constraints of SMEs. Subscription-based pricing models, open-source platforms, and modular AI solutions can help reduce the financial burden of implementation.
- ii. **Capacity Building and Training:** Governments, industry associations, and private sector stakeholders should collaborate to organize training programs and workshops to enhance SMEs' technical expertise in AI. These initiatives should focus on equipping SMEs with the skills needed to implement and manage AI solutions effectively.
- iii. **Improved Access to Financing:** Financial institutions and development agencies should create funding programs specifically designed to support SMEs in adopting advanced technologies. Subsidies, grants, and low-interest loans can help alleviate the cost barriers associated with AI adoption.
- iv. **Policy and Infrastructure Support:** The government should prioritize investments in digital infrastructure, including high-speed internet and reliable power supply, to create an enabling environment for AI adoption. Policies that incentivize technological innovation and provide tax benefits for AI investments can further encourage SMEs to embrace AI.
- v. **Strategic Collaboration and Partnerships:** SMEs should seek partnerships with technology firms, research institutions, and industry associations to gain access to AI expertise and resources. Collaborative efforts can facilitate knowledge-sharing and help SMEs leverage AI for strategic decision-making and innovation.

Limitations of the Study

Despite providing valuable insights into AI adoption among SMEs in Nigeria's retail sector, this study has certain limitations. First, the research relied on self-reported data collected through a Google Forms survey, which may introduce response bias, as participants might overestimate or underestimate their level of AI adoption. Second, the sample size of 100 SMEs, while diverse, may not fully capture the experiences of all retail businesses across different regions of Nigeria, particularly in rural areas where technological adoption is lower. Additionally, the study focused primarily on SMEs that have some level of awareness of AI, potentially excluding businesses that are entirely unfamiliar with AI technologies. Lastly, the research does not include in-depth qualitative interviews or case studies that could provide richer insights into the specific challenges and decision-making processes of SMEs integrating AI. Future studies should consider a mixed-methods approach with larger sample sizes and broader geographic representation to enhance the generalizability of the findings.

References

- Abbey, Olaleye, I. A., Mokogwu, C., Olufemi-Phillips, A. Q., & Adewale, T. T. (2024). Developing inventory optimization frameworks to minimize economic loss in supply chain management. *International Journal of Advanced Economics*, 6(12), 826– 836.
- Abu, N., da Silva, F. P., & Vieira, P. R. (2024). Government support for SMEs in the Fintech Era: Enhancing access to finance, survival, and performance. *Digital Business*, 5(1), 100099.

- Adeosun, O. T., & Shittu, A. I. (2021). Small–medium enterprise formation and Nigerian economic growth. *Review of Economics and Political Science*. Advance online publication.
- Alexander, T., & Andreas, J. (2022). E-Commerce in Nigeria: A qualitative study on challenges in the Nigerian E-Commerce landscape and solution approaches [Master's Thesis, Dalarna University].
- Babatunde, O., Odejide, O. A., Edunjobi, E., & Ogundipe, O. (2024). The role of AI in marketing personalization: A theoretical exploration of consumer engagement strategies. *International Journal of Management & Entrepreneurship Research*, 6(3), 936–949.
- Badghish, S., & Soomro, Y. A. (2024). Artificial Intelligence adoption by SMEs to achieve sustainable business performance: Application of technology–organization– environment framework. *Sustainability*, 16(5), 1864.
- Bala, U., Hamza, A., & Lawal, A. (2024). Artificial Intelligence for small and medium-scale enterprises (SMES) In Nigeria: Highlighting key applications (APPs), benefits and challenges. Zenodo.
- Buehler, T. L. (2024, March 4). Artificial intelligence in retail and improving efficiency. American Public University.
- Carayannis, E. G., Dumitrescu, R., Falkowski, T., Papamichail, G., & Zota, N.-R. (2025). Enhancing SME resilience through artificial intelligence and strategic foresight: A framework for sustainable competitiveness. *Technology in Society*, 102835.
- Collins, C., Dennehy, D., Conboy, K., & Mikalef, P. (2021). Artificial intelligence in information systems research: A systematic literature review and research agenda. *International Journal of Information Management*, 60, 102383.
- Ebenibo, L., Enyejo, J. O., Addo, G., & Olola, T. M. (2024). Evaluating the sufficiency of the data protection act 2023 in the age of Artificial Intelligence (AI): A comparative case study of Nigeria and the USA. *International Journal of Scholarly Research and Reviews*, 5(1), 88–107.
- Ebuka, A. A., Emmanuel, D., & Idigo, P. (2023). Artificial Intelligence as a catalyst for the sustainability of small and medium scale businesses (SMEs) in Nigeria. *Annals of Management and Organization Research*, 5(1), 1–11.
- Edward, I., & Oguh, F. A. (2024). The impact of AI infrastructures on small and medium enterprises (SMEs) performance in Edo State Nigeria.
- Füller, J., Hutter, K., Wahl, J., Bilgram, V., & Tekic, Z. (2022). How AI revolutionizes innovation management – Perceptions and implementation preferences of AI-based innovators. *Technological Forecasting and Social Change*, 178, 121598.

- Haefner, N., Parida, V., Gassmann, O., & Wincent, J. (2023). Implementing and scaling artificial intelligence: A review, framework, and research agenda. *Technological Forecasting and Social Change*, 197, 122878.
- Haleem, A., Javaid, M., Qadri, M. A., Singh, R. P., & Suman, R. (2022). Artificial Intelligence (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks*, 3, 119–132.
- Hariguna, T., & Ruangkanjanases, A. (2024). Assessing the impact of artificial intelligence on customer performance: A quantitative study using partial least squares methodology. *Data Science and Management*, 7(3).
- Iyelolu, V., Ebele, E., Idemudia, C., & Ignatius, T. (2024). Driving SME innovation with AI solutions: Overcoming adoption barriers and future growth opportunities. *International Journal of Science and Technology Research Archive*, 7(1), 36–54.
- Joel, O. S., Oyewole, A. T., Odunaiya, O. G., & Soyombo, O. T. (2024). Leveraging artificial intelligence for enhanced supply chain optimization: A comprehensive review of Current practices and future potentials. *International Journal of Management & Entrepreneurship Research*, 6(3), 707–721.
- Joshua, S., Gambo, S., Olubodun, N., & Ameh, S. (2024). Artificial intelligence and business security among SMEs in Abuja Metropolis. *International Journal of Management Technology*, 11(3), 17–41.
- Kaliyadan, F., & Kulkarni, V. (2019). Types of variables, descriptive statistics, and sample size. *Indian Dermatology Online Journal*, 10(1), 82–86.
- Kempis, M., & Ogden, T. (2023). Small Firm Diaries firm profile data from the Small Firm Diaries Nigeria.
- Kukreja, A. (2025). AI adoption in SMEs: Integrating supply chain and financial strategies for competitive advantage. *International Journal for Multidisciplinary Research (IJFMR)*, 7(1).
- Kumar, V., Ashraf, A. R., & Nadeem, W. (2024). AI-powered marketing: What, where, and how? *International Journal of Information Management*, 77, 102783.