

INFLUENCE OF EMERGING TECHNOLOGIES ON THE PERFORMANCE OF MICRO-BUSINESS ENTERPRISES IN EBONYI STATE

Igboji Hanna Odion^{*1} & Dr. Lawrence C. Okafor²

Department of Business Management and Entrepreneurship, Faculty of Management
Sciences, Ebonyi State University, Abakaliki

Article Received: 11 April 2026, Article Revised: 01 May 2026, Published on: 21 May 2026

***Corresponding Author: Igboji Hanna Odion**

Department of Business Management and Entrepreneurship, Faculty of Management Sciences, Ebonyi State
University, Abakaliki

DOI: <https://doi-doi.org/101555/ijarp.7894>

ABSTRACT

The seminar determined the influence of emerging technologies on the performance of micro-business enterprises in Ebonyi State. The objectives of the study were to determine the influence of blockchain technology on the performance of micro-business enterprises in Ebonyi State; influence of biotechnology on the performance of micro-business enterprises in Ebonyi State; and the influence of artificial intelligence (AI) on the performance of micro-business enterprises in Ebonyi State. Three research questions and three null hypotheses were formulated from the specific objectives to guide the study. The population of the study consisted of registered micro-business owners and operators in Ebonyi State. These include individuals involved in agro-processing, retail services, tech-enabled services, local food production, and other small-scale enterprises that operate with minimal capital and workforce. A sample size of 120 respondents was drawn from the study population using a multi-stage sampling technique. The instrument used for data collection was a structured questionnaire titled “Emerging Technologies and Micro-Business Performance Questionnaire (ETMBPQ)”. The instrument was validated by three experts from the Department of Entrepreneurship and Business Management, and reliability established which yielded the reliability index of 0.84. Data collected were analyzed using descriptive and inferential statistical tools. The descriptive statistics such as mean scores and percentages were used to answer the research questions. A benchmark mean of 2.50 was used as the cut-off for decision-making. However, inferential statistics including the Chi-

square test of independence and One-Way Analysis of Variance (ANOVA) were used to test the hypotheses at 0.05 level of significance. The revealed that blockchain technology, biotechnology and AI significantly influence ($p < 0.05$) the performance of micro-business enterprises in Ebonyi State. The study recommended among other things that Government agencies, NGOs, and business development centers should provide training programs to improve digital literacy and raise awareness about blockchain, biotechnology, and AI applications among micro-entrepreneurs.

KEYWORDS: *Influence, Emerging Technologies, performance, micro-business enterprises, Ebonyi State.*

INTRODUCTION

The importance of emerging technologies in the growth and performance of micro business ventures in any country, be it developed, developing and underdeveloped cannot be underestimated. The intersection of emerging technologies and business ventures has gained a significant attention from scholars, policymakers, and practitioners in recent years, reflecting the growing recognition of technology-driven entrepreneurship as a key driver of innovation, economic growth, and societal progress. While these technologies are commonly associated with high-end industries and urban economies, their relevance to micro-business enterprises, particularly in developing regions such as Ebonyi State, Nigeria, cannot be overemphasized. The emergence and evolution of technology-driven businesses are grounded in various theoretical perspectives that seek to elucidate the drivers, mechanisms, and outcomes of entrepreneurial behavior in the context of technological innovation (Emon, 2023). One such perspective is the resource-based view (RBV) of the firm, which posits that business ventures can gain competitive advantage by leveraging unique resources and capabilities, including technological know-how, intellectual property, and strategic partnerships (Tiwari, Mehta and Oberoi, 2019). Among these transformative technologies are blockchain, biotechnology, and artificial intelligence (AI), which are increasingly influencing how enterprises, both large and small function in an ever-changing market landscape. While these technologies are commonly associated with high-end industries and urban economies, their relevance to micro-business enterprises, particularly in developing regions such as Ebonyi State, Nigeria, cannot be overemphasized.

Blockchain technology, known for its decentralized and transparent data management system, has the potential to enhance transaction security, supply chain tracking, and digital identity management for micro-businesses. Biotechnology, though traditionally associated with the medical and agricultural sectors, has become increasingly relevant in food production, waste recycling, and local agro-processing activities that dominate many micro-enterprises in virtually all over the world. Meanwhile, Artificial Intelligence (AI) provides innovative solutions through predictive analytics, customer relationship management, and inventory optimization, which can significantly enhance business efficiency and decision-making (Olaoye & Olatunji, 2022). Despite the enormous promise these technologies hold, many micro-business enterprises in in modern time appear to lack the knowledge, infrastructure, and policy support needed for adoption and effective utilization.

It is imperative to note that the structural and operational changes at the market levels have intensified the competition within the business environment, where marketers are playing the pivotal role. Under this changed situation, there is need for the adoption of emerging technologies to enable the entrepreneurship ventures to fit into the competitive markets in the global world. Although emerging technologies have taken center stage in the world of business, much emphases have not been given towards this direction innovativeness by researchers, business educators and educationist particularly in the performance of micro-business enterprises in Ebonyi State. It is against this background that this study determined the influence of emerging technologies on performance of micro-business enterprises in State Nigeria.

Statement of the Problem

Micro-business enterprises in Ebonyi State, like many in sub-Saharan Africa, face structural and operational challenges that limit growth and sustainability. Although emerging technologies offer practical solutions to challenges such as poor record-keeping, insecure transactions, inefficient supply chains, and low product quality, their uptake among micro-enterprises in the region as submitted by Chukwu and Anya in 2021 was very low. Blockchain could offer trust-based solutions to transactional relationships; biotechnology could enhance value addition in agricultural products; and AI could streamline customer engagement and inventory systems.

However, many of these micro-enterprises either inadequate awareness or operate in environments where such technologies are underutilized or inaccessible. There is limited empirical data on whether micro-businesses in Ebonyi State use these technologies, the extent of their use, and the measurable outcomes on business performance. This knowledge gap creates a barrier to developing supportive interventions and policies tailored to the technological needs of micro-enterprises in the region.

Objectives of the Study

The main purpose of the study was to determine the influence of emerging technologies on the performance of micro-business enterprises in Ebonyi State. Specifically, the study was designed to ascertain the;

1. The influence of blockchain technology on the performance of micro-business enterprises in Ebonyi State.
2. The influence of biotechnology on the performance of micro-business enterprises in Ebonyi State.
3. The influence of artificial intelligence (AI) on the performance of micro-business enterprises in Ebonyi State

Research Question

The following research questions guided the study

1. What are the influence of blockchain technology on the performance of micro-business enterprises in Ebonyi State?
2. What are influence of biotechnology on the performance of micro-business enterprises in Ebonyi State?
3. What are influence of Artificial Intelligence (AI) on the performance of micro-business enterprises in Ebonyi State?

Hypotheses

The following three (3) null hypotheses were tested at 0.05 level of significance.

H₀₁: Blockchain technology has no significant influence on the performance of micro-business enterprises in Ebonyi State.

H₀₂: Biotechnology has no significant influence on the performance of micro-business enterprises in Ebonyi State.

H₀₃: Artificial Intelligence has no significant influence on the performance of micro-business enterprises in Ebonyi State.

Scope of the Study

The study was delimited to the influence of emerging technologies on the performance of micro-business enterprises in Ebonyi State. The content scope covers the influence of Blockchain, Biotechnology and Artificial Intelligence on the performance of micro-business in Ebonyi State. The subject scope covers business owners in Ebonyi State that operate in small scale business within the Abakaliki Ebonyi State.

Significance of the Study

This study would be significant for policymakers, researchers, entrepreneurs and businessmen and women. To policymakers, the findings would assist government agencies and non-governmental organizations in designing targeted interventions, training programs, and policies to enhance digital adoption among micro-businesses. The findings would fill an existing gap in the literature concerning the influence of emerging technologies on micro-businesses, particularly in under-researched regions like Ebonyi State. The finding of the study would also enlighten micro-entrepreneurs on the importance of integrating emerging technologies into their operations and provide insights into the practical benefits of doing so. Finally, Tech developers and service providers can leverage the findings to tailor solutions that meet the specific needs of micro-businesses in rural and semi-urban Ebonyi communities.

Limitations of the Study

The following are the limitations of the study

1. The study was limited to micro-business enterprises in Ebonyi State, which limits the generalizability of the findings to other regions or states in Nigeria. Emerging technologies may have different levels of adoption, awareness, and impact in other socio-economic and cultural contexts.
2. The study was also limited to data collected through a structured questionnaire, which depends on the honesty, knowledge, and perceptions of respondents. Hence, the negative attitude of the respondents might have some limitations on the study.
3. The study employed a cross-sectional research design, capturing data at a single point in time. This might limit the ability to determine causal relationships or observe long-term effects of emerging technologies on micro-business performance, as technological impacts often evolve over time.

METHODOLOGY

The study adopted a descriptive survey research design. According to Abonyi, Okereke, Omebe and Anugwo (2022), descriptive design is a type of research method used to describe the characteristics of a population, phenomenon, or situation being studied. It does not answer questions about how, when, or why something happens but rather focuses on what is happening. This design was considered appropriate because it allowed the researcher to gather data from a sample of respondents using structured questionnaires to determine the perceived influence of blockchain technology, biotechnology, and artificial intelligence on the performance of micro-business enterprises in Ebonyi State. The design also facilitated the use of inferential statistics (Chi-square and ANOVA) to test hypotheses. The study was conducted in Ebonyi State, located in the South-Eastern region of Nigeria. Ebonyi State is predominantly rural but has a growing number of micro-business enterprises across local government areas, especially in the areas of retail, agriculture, food processing, and technology-enabled services. The state was selected due to the increasing interest in technology adoption among local entrepreneurs and the government's efforts to promote digital literacy and innovation.

The population of the study consisted registered micro-business owners and operators in Ebonyi State. These include individuals involved in agro-processing, retail services, tech-enabled services, local food production, and other small-scale enterprises that operate with minimal capital and workforce. The estimated population was drawn from local government business registration units and trade associations. A sample size of 120 respondents was drawn from the study population using a multi-stage sampling technique. In the first stage, three local government areas (Abakaliki, Afikpo North, and Onicha) were randomly selected. In the second stage, purposive sampling was used to select micro-business owners who had some level of interaction with or awareness of digital technologies. Finally, systematic sampling was employed to select 40 respondents from each LGA, ensuring representation across sectors.

The instrument used for data collection was a structured questionnaire titled "Emerging Technologies and Micro-Business Performance Questionnaire (ETMBPQ)". The questionnaire was divided into sections: Section A covered information on the demographic data of respondents. Section B covers information on the items on the influence of blockchain technology (4 items), Section C: Items on the influence of biotechnology (4 items), while

Section D covered information on the items on the influence of artificial intelligence (4 items). The questionnaire used a 4-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1). The questionnaire was validated by three experts from the Department of Entrepreneurship and Business Management. Their suggestions led to improvements in clarity, relevance, and technical accuracy. The reliability of the instrument was determined through a pilot test conducted on 20 micro-entrepreneurs in a neighboring state (Enugu State), who were not part of the main study. The internal consistency of the instrument was measured using Cronbach's Alpha, and a reliability coefficient of 0.84 was obtained, indicating a high level of reliability. The researcher administered the questionnaires in person with the help of trained assistants. Respondents were briefed about the purpose of the study and assured of the confidentiality of their responses. The completed questionnaires were collected on the spot to ensure a high response rate. Data collected were analyzed using descriptive and inferential statistical tools. The descriptive statistics such as mean scores and percentages were used to answer the research questions. A benchmark mean of 2.50 was used as the cut-off for decision-making. However, one-Way Analysis of Variance (ANOVA) were used to test the hypotheses at 0.05 level of significance.

RESULTS

The data collected were presented in tables based on the three research questions and hypotheses developed for the study

Research Question One: What is the influence of blockchain technology on the performance of micro-business enterprises in Ebonyi State?

Table 1: Respondents' Opinion on the Influence of Blockchain Technology on the performance of micro-business enterprises in Ebonyi State.

S/N	Item Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Decision
1	Blockchain helps track business transactions securely.	42	30	20	8	3.06	Agree
2	Blockchain enhances trust between micro entrepreneurs and customers.	38	34	18	10	3.00	Agree
3	Lack of knowledge limits blockchain usage in micro-enterprises.	55	25	15	5	3.30	Agree
4	Blockchain reduces fraudulent practices.	48	33	14	5	3.24	Agree

The data presented in **Table 1** shows that the mean scores for all items are above the decision benchmark of 2.50, indicating that respondents believe blockchain positively influences the performance of micro-businesses by improving trust, transparency, and fraud prevention, although adoption is hindered by lack of awareness.

Research Question Two: What is the influence of biotechnology on the performance of micro-business enterprises in Ebonyi State?

Table 2: Respondents' Opinion on the Influence of Biotechnology on the performance of micro-business enterprises in Ebonyi State.

S/N	Item Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Decision
5	Biotechnology improves product shelf-life	46	37	12	5	3.24	Agree
6	Local food processors benefit from simple biotech innovations	40	35	15	10	3.05	Agree
7	There is poor access to biotech training among micro-entrepreneurs	52	28	12	8	3.24	Agree
8	Biotechnology contributes to waste reduction in production	43	32	15	10	3.08	Agree

The Data presented in Table 2 shows that all the respondents agree with the mean scores above the criterion mean of 2.50 that biotechnology enhances product quality, reduces waste, and is beneficial in micro-business settings, especially in food processing. However, poor training and awareness are limiting factors.

Research Question Three: What is the influence of artificial intelligence on the performance of micro-business enterprises in Ebonyi State?

Table 3: Respondents' Opinion on the Influence of Artificial Intelligence on the performance of micro-business enterprises in Ebonyi State.

S/N	Item Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Decision
9	AI improves customer service through automation.	44	36	12	8	3.16	Agree
10	AI helps in inventory and sales forecasting	39	34	15	12	2.98	Agree
11	Lack of infrastructure limits AI use in micro-businesses.	60	22	10	8	3.34	Agree
12	AI tools are mostly unaffordable to micro-businesses.	50	30	12	8	3.22	Agree

The Data presented in Table 3 shows that all the respondents agree with the mean scores above the criterion mean of 2.50 that Artificial Intelligence enhances product quality, reduces waste, and is beneficial in micro-business settings, especially in food processing. However, poor training and awareness are limiting factors. The analysis shows that Findings reveal a general agreement that AI technologies enhance micro-business performance, particularly in customer service and operations. However, infrastructural and financial constraints hinder widespread adoption.

Test of Hypotheses

Hypothesis One (H₀₁): Blockchain technology has no significant influence on the performance of micro-business enterprises in Ebonyi State.

Table 4: ANOVA Summary on the influence on the performance of Blockchain on Micro-Business Enterprises in Ebonyi State.

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	p-value	Decision
Between Groups	52.6	2	26.3	4.92	0.012	Reject H ₀ (Sig.)
Within Groups	187.4	35	5.35			
Total	240.0	37				

Data in Table 4 shows that $p = 0.012 < 0.05$. Therefore, there is a statistically significant difference in micro-business performance across the three levels of blockchain usage.

Hypothesis Two (H₀₂): Biotechnology has no significant influence on the performance of micro-business enterprises in Ebonyi State.

Table 5: ANOVA Summary on the influence of Biotechnology on Performance of Micro-Business Enterprises in Ebonyi State.

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	p-value	Decision
Between Groups	47.9	2	23.95	4.11	0.025	Reject H ₀ (Sig.)
Within Groups	203.1	35	5.80			
Total	251.0	37				

Data in Table Five also shows that $p = 0.025 < 0.05$. Hence, the null hypothesis is rejected. Thus, biotechnology significantly influences the performance of micro-business enterprises.

Hypothesis Three (H₀₃): Artificial Intelligence has no significant influence of Artificial Intelligence (AI) on the performance of micro-businesses.

Table 6: ANOVA Summary on the influence of AI on the Performance of Micro-Businesses in Ebonyi State.

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	P-value	Decision
Between Groups	68.4	2	34.2	5.67	0.004	Reject H ₀ (Sig.)
Within Groups	210.6	35	6.02			
Total	279.0	37				

The p-value (0.004) is less than 0.05, so the null hypothesis is rejected. This implies that AI usage level significantly affects micro-business performance.

DISCUSSION OF FINDINGS

The study explored the influence of emerging technologies on the performance of micro-businesses enterprises in Ebonyi State. Three specific purposes guided the study. The findings of this study showed that blockchain technology significantly influences the performance of micro-business enterprises in Ebonyi State. Respondents agreed that blockchain facilitates transparency, secure financial transactions, and trust in business operations. This aligns with the assertion by Tapscott and Tapscott (2016), who described blockchain as a foundational technology for building trust in digital economies due to its decentralized and immutable nature. Additionally, the Chi-square test indicated a statistically significant relationship between blockchain usage and business performance. This corroborates the study by Yermack (2017) who found that small enterprises that adopted blockchain-based supply chain and payment solutions witnessed greater operational transparency and reduced transaction costs.

However, the study also found that adoption among micro-business owners is still limited due to inadequate awareness, technical know-how, and infrastructural challenges. Swan (2015) emphasized that the diffusion of blockchain is slower in developing economies, primarily due to digital illiteracy, lack of supportive policies, and cost of adoption. This suggests that although blockchain holds transformational potential for micro-enterprises, deliberate efforts are needed to build capacity and access.

The study also revealed that biotechnology particularly in food processing, waste management, and product preservation positively influences micro-businesses in Ebonyi State. Respondents noted improvements in product shelf-life, reduction in spoilage, and enhancement of overall product quality. These findings are supported by Adeboye and Ogunleye (2020) who identified the use of simple biotech innovations such as fermentation, bio-preservation, and organic waste conversion as highly beneficial to food-based micro-enterprises in Nigeria. They found that these technologies helped in reducing operational losses and increasing market competitiveness. In addition, Okonkwo and Nwachukwu (2018) emphasized that biotechnology enhances agricultural productivity and supports micro-agro-industries by improving crop processing and storage, especially in rural regions. The respondents in this study similarly indicated that biotechnology contributed to better product presentation, nutritional value retention, and improved customer satisfaction.

Nevertheless, the study identified a gap in accessibility and training. Many entrepreneurs lack adequate exposure to biotechnology applications, which hinders widespread implementation. This limitation is in line with FAO (2014), which reported that small-scale entrepreneurs in Africa often face challenges in accessing biotech tools due to cost, regulatory bottlenecks, and lack of institutional support.

Finally, the findings of the study showed that AI technologies such as automated customer service (chatbots), inventory management systems, and data-driven sales forecasting are perceived to enhance business efficiency, reduce human error, and improve customer relations. These results are consistent with Davenport and Ronanki (2018), who noted that AI drives business process improvement by offering predictive capabilities and personalized customer engagement. Moreover, McKinsey Global Institute (2019) reported that AI adoption among SMEs has been linked to higher productivity, customer satisfaction, and cost savings, especially in retail and service sectors.

However, the study found that despite the benefits, AI adoption among micro-enterprises in Ebonyi State remains low due to limited infrastructure, high cost of AI tools, and poor digital readiness. Brynjolfsson and McAfee (2014) similarly warned that without enabling infrastructure and training, small businesses in developing regions may be left behind in the AI revolution. It is imperative to note that these findings highlight the paradox where micro-entrepreneurs acknowledge the value of AI but are unable to adopt it fully due to systemic and environmental barriers.

Implication of the Findings of the Study

Overall, the study reinforces the theoretical proposition of Rogers' Diffusion of Innovations Theory (2003), which explains that the adoption of technology in any society depends on perceived advantages, compatibility with existing values, and the complexity of the innovation. In the context of Ebonyi State, although the perceived benefits of blockchain, biotechnology, and AI are high, the adoption could remain slow due to technical, infrastructural, and educational barriers.

In addition, this study's findings align with the Technology-Organization-Environment (TOE) Framework proposed by Tornatzky and Fleischer (1990), which posits that organizational context (e.g., micro-business capacity), technological context (ease of use and relative advantage), and environmental context (regulatory and infrastructural support) all influence technology adoption.

CONCLUSION

Based on the findings, the study concludes that emerging technologies blockchain, biotechnology, and artificial intelligence have a significant and positive influence on the performance of micro-business enterprises in Ebonyi State. These technologies can enhance operational efficiency, reduce wastage, improve customer satisfaction, and boost profitability. However, the full potential of these technologies is not being realized due to barriers such as lack of awareness, inadequate infrastructure, insufficient training, and high costs of adoption. Thus, while emerging technologies present numerous opportunities for micro-business transformation, intentional efforts must be made to bridge the digital divide and equip entrepreneurs with the necessary tools and knowledge.

Recommendations

Based on the findings and conclusion, the following recommendations are made:

1. Government agencies, NGOs, and business development centers should provide training programs to improve digital literacy and raise awareness about blockchain, biotechnology, and AI applications among micro-entrepreneurs.
2. Policymakers should provide subsidies or financial incentives to support micro-businesses in acquiring and implementing emerging technologies.
3. Technology Hubs and Incubators should be established as tech hubs in rural and urban areas of Ebonyi State to provide access to shared digital infrastructure, mentorship, and support for startups and micro-businesses.

4. Institutions of learning should integrate modules on emerging technologies in business and vocational education to prepare future entrepreneurs.
5. Investments should be made in digital infrastructure (e.g., internet connectivity, power supply) to support the digital transformation of micro-enterprises.

REFERENCES

1. Abonyi, S.O., Okereke, S.C., Omebe, C., & Anugwo, D. (2022). *A first Course in Education Measurement and Evaluation Enugu*: Fred Ogah Publishers.
2. Abubakar, A., Bala, K., & Yusuf, M. (2020). Artificial intelligence and its role in startup development in Nigeria. *Journal of Emerging Technologies in Business*, 6(2), 45–59.
3. Adeboye, O., & Ogunleye, T. (2020). Biotechnology adoption among food-based micro-enterprises in Nigeria: Impacts and challenges. *Journal of Agribusiness Innovation*, 9(1), 45–57.
4. Adeoye, B., & Abiola, R. (2021). Blockchain adoption and its implications for small businesses in Nigeria. *African Journal of Digital Economy*, 5(1), 88–104.
5. Aina, J. O., & Salihu, M. A. (2023). Artificial intelligence and digital transformation in education: Prospects for the Nigerian system. *Journal of Educational Innovation and Research*, 4(3), 110–124.
6. Akinyemi, M. O., & Daramola, A. O. (2020). Biotechnology and agricultural productivity in Nigeria: Evidence from small agro-businesses. *Journal of Agribusiness and Technology*, 8(1), 33–47.
7. Audretsch, D. B., & Belitski, M. (2020). Entrepreneurship and economic growth in the context of biotechnology. *Small Business Economics*, 55(4), 851–865. Assessed from <https://doi.org/10.1007/s11187-019-00164-7>
8. Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.
9. Chukwu, C., & Anya, P. A. (2021). Adoption of digital technologies by micro-enterprises in Ebonyi State: An empirical study. *Nigerian Journal of Business Research*, 9(2), 75–92.
10. Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108–116.
11. Emon, E. (2023). The role of emerging technologies in the digital transformation of small business enterprises. *International Journal of Business and Tech Innovation*, 10(1), 58–72.

12. Emon, E., & Nipa, T. (2024). Biotechnological innovations and business development: A review of trends and impact. *Journal of Advanced Bioeconomy*, 3(2), 21–34.
13. FAO. (2014). *Biotechnology applications in small-scale food processing: Challenges and opportunities in Africa*. Food and Agriculture Organization of the United Nations.
14. Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press.
15. McKinsey Global Institute. (2019). *Artificial intelligence: The next digital frontier?* McKinsey & Company. Assessed from <https://www.mckinsey.com/mgi>
16. Norwegian University of Science and Technology. (2024). *What is biotechnology?* Retrieved from <https://www.ntnu.edu/biotechnology/about>
17. Olaoye, M. A., & Olatunji, B. A. (2022). Artificial intelligence in small business management in Nigeria: Prospects and challenges. *Journal of Emerging African Economies*, 7(1), 98–113.
18. Olawumi, A. T., & Bello, S. A. (2019). Bioremediation technology and sustainable development: A West African perspective. *Environmental Sustainability Journal*, 4(2), 66–79.
19. Osuagwu, C. G., & Chukwu, O. A. (2021). Adoption of artificial intelligence in Nigerian SMEs: Opportunities and constraints. *Journal of Small Business and Innovation*, 6(2), 123–135.
20. Pilkington, M. (2016). Blockchain technology: Principles and applications. In F. X. Olleros & M. Zhegu (Eds.), *Research handbook on digital transformations* (pp. 225–253). Edward Elgar Publishing.
21. Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach (4th ed.)*. Pearson.
22. Schwab, K. (2020). *Shaping the future of the fourth industrial revolution*. Currency.
23. Tiwari, R., Mehta, S., & Oberoi, J. S. (2019). Resource-based view and innovation in entrepreneurship: A framework for competitive advantage. *International Journal of Entrepreneurship and Small Business*, 38(4), 509–524.
24. Wang, Y., Zhang, L., & Ma, J. (2020). Blockchain implementation in Chinese small businesses: Transparency, trust and traceability. *Asian Journal of Business Technology*, 12(3), 150–170.
25. Wright, A., & De Prato, G. (2018). Blockchain applications in entrepreneurship and business systems. *OECD Digital Economy Papers*, No. 273. Assessed from
26. <https://doi.org/10.1787/5jz2pw5j2t8t-en>