

**ADOPTION OF ARTIFICIAL INTELLIGENCE BY SMALL AND MEDIUM-SCALE ENTERPRISES IN EMERGING ECONOMIES: AN EXPLORATORY INSIGHT**

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**Abstract**

This paper provided a review of Artificial Intelligence (AI) from an exploratory viewpoint and its imperatives for growth of SMEs in the context of emerging economies. The paper underscores the transformative impact AI has on modern business, and highlights the immense advantages and barriers associated with AI adoption by SMEs in less developed economies. The aim is to contribute to the expanding conceptual framework on AI, to deepen understanding and to emphasize the urgent need for AI implementation by SMEs in developing countries. Extant literature validates and indeed strongly supports the view that AI offers ample leverage for SMEs in emerging economies to catalyze innovation, generate employment, and for government and other stakeholders to continue to promote AI technology en route to achieving economic growth and development. The paper concludes that AI adoption is critical for the success of businesses in emerging economies and recommends that governments of developing countries should provide robust policy frameworks and financial incentives to enable SMEs adopt and implement AI.

**Keywords:** Artificial Intelligence, Emerging economies, SMEs, technology,

**Introduction**

Small and medium-scale enterprises (SMEs) contribute significantly to national and regional development. Thus, SMEs are deemed fundamental components of the economic fabric of both developed, developing and underdeveloped economies (Ateke & Oluigbo-Moses, 2023; Keskin et al., 2010). European Investment Bank (2011) affirms that SMEs promote innovation, generate employment, increase national output, foster entrepreneurship, promote export and enhance prosperity. World Bank (2017) reports that SMEs are essential to overall economic health and development of nations, accounting for about 90 per cent of businesses and more than 50 per cent of employment globally. The report specifically stated that SMEs contribute as much as 40 per cent of national income (GDP) in the developing countries of South-East Asia and Sub-Saharan Africa.

Literature is replete with evidence of how AI technology impact entrepreneurs' creative and operational processes when adopted as a business model in the quest for competitive advantage (Townsend & Hunt, 2019). Thus, emerging economies around the globe urgently need AI technology to drive innovation, generate employment, encourage local content technology and catalyze indigenous entrepreneurship. In essence, SMEs in emerging economies have a unique opportunity to close the AI adoption/implementation gap in order to appropriate the immense benefits of this modern piece of technology.

Despite the advantages associated with AI technology solutions, it has been observed that the uptake remains relatively low, particularly among SMEs in Nigeria (Ihesiene & Akpojarro, 2015). Many businesses in Nigeria worry that the AI project will be expensive to implement and that it

may pose threats to both highly-skilled and low-skilled jobs. They are also concerned about the possibility of increasing wealth inequality in the future if AI is adopted. This paper believes that SMEs that adopt AI business solutions will be better equipped to handle complex tasks and take advantage of the opportunities offered by this technology to ensure their success in a highly competitive business environment. The fast-developing economies of Asia and Sub-Saharan Africa must therefore leverage the energy of their youthful population and their passion for digital technologies like AI to drive innovation. The FUTURE is TECH!

### **Theoretical Foundations**

Nilsson (2010) refers to AI as the set of activities dedicated to making machines intelligent...describing intelligence as the process which enables an entity to function optimally. The concept of AI technology includes advanced technology solutions that can address situations of uncertainty and intelligence validated by machines as against that of natural intelligence shown by humans (Žigiene et al., 2019).

McCarthy (2007) describes AI as computer systems designed and programmed to perform activities that ordinarily require human intellect. Burns et al. (2021) perceive AI as the simulation of human intelligence done with the help of computer programmes. It entails a complex structure of specially designed hardware and software for writing machine learning algorithms. AI is “artificial” because it is man-made, and is “intelligent” because it is characterized by thoughtful cognitive capacity.

According to Kitsios and Kamariotou (2021), AI enable machines to think like humans and was developed as the simulation of normal intelligence that are programmed to imitate the actions of human beings. AI innovations are already opening up new vistas of opportunities, new types of industries, business models, better ways of solving old problems while simultaneously abandoning old styles of doing things (PWC, 2020).

AI applications are currently being deployed in both private and public sectors globally and thankfully, some governments of fast growing economies in Asia (e.g. China, South Korea, Taiwan and Vietnam) and Sub-Saharan Africa (eg; Nigeria, South Africa, Kenya, Ethiopia) are taking deliberate steps to promote AI development in their respective industries. Whereas in China, the impact of AI on employment is more disruptive in the short run, it is however, creating new employment opportunities in the long-run (Chatterjee et al., 2021).

Chatterjee et al. (2021) also confirm that smart technologies like AI are helping to improve business performance by saving time and reducing cost. There are also indications that the relationship between AI innovation and SMEs growth in terms of turnover is high (Akinwale et al., 2017). Available empirical evidence in emerging economies indicate positive effects of AI and strongly points to the fact that these significant effects might even be more pronounced in developing than in the developed economies (Oyebiyi, 2019; Akinwale et al., 2017).

However, available data reveal that variables like employees’ AI capability and knowledge significantly influence AI adoption among SMEs in developing countries like Nigeria (Oyebiyi, 2019). Some other local factors like regulatory frameworks, cultural differences, government incentives and level of economic development also significantly influence AI adoption, but investigating how these factors shape strategies and outcomes of AI applications by SMEs in

different countries can provide valuable insights for tailoring specific AI adoption approaches and policies to the unique characteristics of SMEs in diverse global country contexts (Boubaker et al., 2023). Furthermore, examining how AI adoption strategies, barriers, and outcomes can differ among SME categories or demographics will deepen the understanding of specific approaches for implementing and maximizing AI benefits, while addressing the associated constraints and opportunities with each profile.

### **Conceptual definitions**

The following are a few definitional propositions of AI by various scholars:

- AI refers to the study and development of computer systems that imitate human intelligence in order to accomplish activities often reserved for humans. (Nilsson, 1998).
- AI is the study and design of intelligent agents that can perceive their environment, reason for it, and take actions to achieve goals (Poole et al., 2017).
- AI is the process of programming computers to mimic human intellect in areas such as speech recognition, decision making, and language comprehension (Kelleher & Tierney, 2018).
- AI means the development of intelligent agents that can perceive their environment, reason about the information they perceive, and take actions to achieve specific goals" (Wooldridge, 2009).

This paper defines AI as "the capacity of programmed computer/machines to imitate human intelligence in a way to accomplish tasks, but devoid of critical imaginative or analytical thinking."

### **SMEs as Entrepreneurs**

The European Commission (2017) defines SMEs as firms that have less than 250 employees or that generate up to 50 million euros in annual turnover. Robu (2013) views SMEs as small companies that operate a lean organizational structure which makes them flexible, such that they can easily adjust to fluctuating situations of their business environment. The World Bank (2023) reported that SMEs are major drivers of growth in developing nations accounting for approximately 40 per cent of GDP contributions in emerging economies. It reveals that 7 out of 10 jobs in these countries are created by SMEs (World Bank, 2023). Thus, the empowerment of SMEs is a critical pathway to the development of the economy of nations all over the world, and particularly for less developed but fast-growing economies.

Peter Drucker in 1985 enunciated the Business-Opportunity theory of Entrepreneurship where he described the entrepreneur as 'an individual who seeks change, responds to change and strives to exploit the opportunities available to him'. Drucker (1985) succinctly notes that SMEs as entrepreneurs, typically seek to take advantage of business opportunities in their environment occasioned by the dynamics of change based on their competencies and available resources. In this view, these opportunities come as new concepts, changes in technology, variety of goods and services which can be adopted and implemented in a market. Essentially, the business-opportunity theory is about the creative ability of SMEs/entrepreneurs to anticipate and capitalize on changes in the business environment to exploit available opportunities with a view to making profit, to enhance productivity and to generate employment in an economy.

Stevenson and Jarillo (1990) further established that SMEs as entrepreneurs do not deliberately initiate change, rather they act in response to it by taking advantage of opportunities created by

change due to technological advancement within the constraints of available resources. In other words, opportunity-based SMEs/entrepreneurs engage in business with the clear motive for profit, growth, innovation and personal achievement (Sara, Dejan, Amadeja & Anja 2024; Renuka & Anju, 2023). This paper adopts Drucker's business-opportunity theory as the anchor point to give strength and relevance to the opportunity of adopting the AI technology by SMEs for growth and development in the context of emerging economies.

### **SMEs and Artificial Intelligence**

In a modern world in which digitalization has become a way of life, AI innovation is likely to become a handy tool for SMEs' competitiveness. AI allows SMEs to be innovative, attain economy of scale and enable access to global markets and knowledge networks at relatively low cost (OECD, 2015). In the opinion of Trott (2005), innovation comprises the application of new knowledge to new products. AI reshapes and enables SMEs to rethink their business processes through innovations (Haefner et al., 2021). AI technology facilitates new opportunities for SMEs growth and enables them to compete in both local and global markets through product innovation and improved process delivery. AI also facilitates the emergence of start-ups that leverage Internet services at relatively lower costs.

The central point of AI technology is that it can deliver better quality, higher speed, greater efficiency, and outstanding business outcomes than human beings (Agrawal et al., 2018). McKinsey (2018) predicts a potential contribution of 1.2 percentage points by AI to global GDP growth by 2030. Purdy and Daugherty (2017) also predict an increase of 2 percentage points by AI in annual global gross value by the year 2035. These call for robust business models where AI processes can be integrated into innovation management for SMEs development in emerging economies. With AI emergence, it is expected that the innovation management role will change in a way to enhance the GDP contributions of SMEs in developing economies, not just in Asia and Sub Saharan Africa but across the globe.

### **AI and SMEs Employment Generation**

Adewoye (2019) asserts that diverse schools of thought exist around AI deployment in the workforce. While some schools of thought argue that AI will not necessarily lead to job losses but will cause a major disruption/shift in the dynamics of work in the future; others believe that AI will significantly alter the nature of jobs that will be accessible to the workforce, especially for persons who lack the essential skills to relate with AI and the Internet technology.

With advances in technology, certainly some jobs will be extinct and some will be created or transformed. Some other tasks will also require new set of skills, and yet some particular professions will require distinctive skills that AI technology cannot replace. Such jobs as in the creative industry involving complex communications, critical system thinking, and the talent to work in complex environments may not be replaceable by AI technology (Ufua et al., 2022).

Essentially, the jobs of the future will require fundamental changes in skill sets. Repetitive tasks are likely to be performed with support processes driven by AI, such that the workforce will become more productive (EY, 2017). Ultimately, AI replacement for human labour will increase efficiency, productivity, quality delivery and minimize the overall cost of goods and services.

Overall, SMEs are relevant to employment creation, production of goods and services, especially in the fast growing economies (Adeosun & Shittu, 2021). In the emerging economies of Sub-

Saharan Africa, over 50 per cent of jobs are created by SMEs, most of them from the informal private sector (Lorenz & Pommet, 2018). Nwugballa et al. (2016) reports that SMEs contribute up to 75 per cent of total employment in developing countries like Nigeria.

Although significant GDP growth has been recorded by SMEs in these emerging economies, much is still required by way of government incentives to encourage AI technology adoption by SMEs. Nigeria and Africa's AI infrastructure need to improve by ensuring that necessary policy frameworks are in place to encourage AI adoption and implementation.

### **SMEs Development in Nigeria**

Small and Medium Enterprises Development Agency of Nigeria (SMEDAN, 2013) describes SMEs as small businesses with number of workers ranging between 10 and 199, who are involved in routine business activities with the sole aim of making profit and the personal desire for achievement. SMEDAN (2013) believes that technology adaptation is crucial to SMEs' role as catalysts of economic development and key drivers of prosperity. National Bureau of Statistics reports that SMEs in Nigeria account for a total of 17.4 million businesses, about 48.5 per cent of the national GDP in the last 5 years (NBS, 2020). It is also reported that about 50 per cent of the industrial jobs and nearly 90 per cent of jobs in the manufacturing sector come from SMEs (PwC, 2020). According to Ajibola (2020), SMEs generate as much as 80 per cent of jobs in Nigeria.

The Nigerian government is actively engaged in partnerships on the roadmap to AI development with the Ministry of Technology and the National Agency for Research and Robotics. This Centre partners with international research bodies to enable training on AI skills for students, interns and fresh graduates, and the aim is to build Nigeria's capacity to leverage AI and other advanced technologies for economic development (Access Partnership, 2019; Gwagwa et al., 2020). Given the required support, SMEs in Nigeria have a unique opportunity as the backbone of economic development to stimulate growth by readily adopting AI technology business solutions to improve the performance of the nation's economy and enhance the prosperity of her citizens.

### **Benefits of SMEs Adoption of AI tools**

The following are some of the benefits derivable by SMEs that adopt and implement AI technology:

- By automating routine tasks, AI allows employees to focus on more strategic and value-adding activities, and the resultant efficiency invariably leads to improved productivity and enhanced performance.
- Cost savings is a major benefit of AI implementation as it can drastically cut operational costs by automating processes and reducing the need for human interventions.
- AI can also optimize supply-chain operations by predicting demand more accurately, thereby reducing excess inventory and associated costs. These efficiencies lower operational costs and enable better allocation of resources to achieve strategic goals.
- AI-powered tools can analyze large amounts of data to identify market trends, customer preferences, and emerging opportunities. This capability allows SMEs to develop their strategies to meet specific market demands. This means that SMEs can expand their operations without proportionally increasing their workforce, thereby maintaining a lean structure that is both flexible and responsive to competitive market conditions.

- The integration of AI in businesses offers a pathway to significant growth and innovation. By leveraging AI technology tools, SMEs can improve their business processes, customer service delivery and overall efficiency.
- AI facilitates market expansion through language translation and localization, and enhances e-commerce personalization to increase conversion rates and improve customer experience.
- AI-enabled financial management applications offer significant benefits for various financial tasks, such as tracking expenses, managing invoices, and predicting financial outcomes. This will help SMEs better manage their finances.
- Customer preference analysis using AI helps to identify the most effective channels and platforms for reaching a target audience at relatively lower cost.

These benefits further demonstrate the potential of AI to play a key role in the economic growth and development of emerging economies, especially across Asia and Sub-Saharan Africa. PunchOnline (2025) reports that MediaFuse-Densu/Nigeria (a Media tech Agency) is pioneering an AI powered integrated growth solutions to redefine the future of Marketing Communications in Nigeria. The Agency affirms its commitment to data-driven innovation to position AI at the forefront of industry transformation. It believes that generative AI will revolutionize target marketing and customer engagement, and emphasize the urgency of AI adoption in the evolving digital business landscapes especially in emerging economies. The agency enjoins SMEs in Nigeria to integrate AI into their business strategies, insisting that the overall goal is to drive impactful business outcomes, challenge conventional business methods, and push for transformative change in fast-growing developing economies.

### **Barriers to SMEs AI Adoption**

Despite the obvious advantages, SMEs in relatively less developed countries (LDCs) still encounter some obstacles in their attempt to implement new technologies, including AI. Generally, the initial investment required to develop, purchase and integrate AI systems can be quite high for SMEs in less developed countries. The shortage of skilled personnel capable of managing AI technologies in emerging economies presents a huge obstacle such that SMEs find it difficult to attract and retain individuals with the necessary AI skills due to their limited resources. Schönberger (2023) enumerates some of the adoption and implementation challenges which invariably affect AI technology adoption by SMEs:

- SMEs in relatively less developed economies believe the cost of implementing and maintenance of AI procedures in their operations could be expensive and for this reason shy away from its adoption.
- Lack of skilled and experienced manpower in AI management is a major barrier to AI adoption by SMEs in emerging economies.
- SMEs in developing economies raise concerns that data security and privacy may be compromised in a bid to adopt AI, and the absence of effective data security infrastructure in these countries may hamper AI adoption.
- SMEs in less developed economies may be reluctant to embrace AI for fear of job loss. Some SMEs believe that the implementation of AI technology in their businesses could lead to job displacement. Aggressive sensitization/advocacy campaigns by governments and other stakeholders may be helpful to allay this fear.

- Integration of AI tools into SMEs existing business processes and procedures may pose a challenge. Hence, a seamless interface between AI technologies and SMEs existing business structures will be required to encourage AI adoption by SMEs and ensure the optimal utilization of AI tools.

To overcome these challenges, government support in the form of financial incentives and clear policy/regulatory frameworks can reduce the financial burden on SMEs in emerging economies and provide them with the ‘means’ to invest in AI technology solutions. Collaborations with larger organizations, including technology service providers and academic institutions can help SMEs build capacity and give them access to cutting-edge AI tools and expertise. Training SMEs’ employees in the various aspects of AI are vital to developing a skilled workforce capable of managing AI tools and applications to ensure that SMEs staff have a thorough understanding of AI tools and their applications.

### Conclusion and Recommendations

AI technology is changing how businesses operate and innovate in recent times in all economies globally. AI technology applications can significantly enhance productivity, reduce costs, and enable operations on a large scale, thus driving innovation and growth. This paper believes that by implementing AI-driven solutions, SMEs in fast developing countries can unlock new opportunities for growth, efficiency and success, thereby positioning themselves at the forefront of the future of business and work. The paper concludes that incorporating AI tools into the operations of SMEs in emerging economies is critical to foster growth and development for the ultimate prosperity of the citizens of such countries.

As technology advances, SMEs in emerging economies must strive to embrace AI in business to enable them harness the full potential of this piece of technology as a competitive edge. The paper recommends that governments of fast-growing economies should support SMEs with funds and regulatory frameworks as part of key policy incentives to enable massive AI adoption and implementation. The paper further recommends that SMEs partner with larger organizations especially in the area of AI training to fast-track adoption. Sensitization/advocacy campaigns by government and other stakeholders may also be required to encourage AI adoption and allay the fears of SMEs in terms of potential job displacement and data security/privacy concerns.

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