

BARRIERS AND ENABLERS TO THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN ENTREPRENEURSHIP EDUCATION AND THEIR IMPLICATIONS FOR ECONOMIC GROWTH IN NIGERIA

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Abstract

This study systematically examined the barriers and enablers to the integration of Artificial Intelligence (AI) in entrepreneurship education and their implications to the economic growth in Nigeria. The studies for the review were selected from peer reviewed literature and relevant scholarly sources that were published between 2020 and 2026 and focused on Nigeria. The studies were selected and a synthesis of the studies was performed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach and thematic analysis. The major themes that surfaced were- barriers to integration of AI, enablers to integration of AI, AI integration and entrepreneurial human capital development, and implications for economic growth. The results revealed that the access to digital infrastructure, insufficient funding, lower competence of educators with AI, outdated curricula, and lower institutional support were significant obstacles. On the other hand, curriculum reform, faculty development, improved infrastructure, institutional commitment and industry education collaboration came out as key enablers. The synthesis also indicated that the effective application of AI can enhance entrepreneurial capacity, such as digital skills, problem solving, strategic thinking, innovation and adaptability and also has broader implications

for employability and enterprise performance and productivity. The study ends with the fact that the focus should move from just promoting the use of AI towards applying AI to create entrepreneurial human capital. It suggests better digital infrastructure, AI capacities building for faculty members, reform of the curriculum and better collaborations between education and industry for the benefit of entrepreneurship education to sustainable economic growth in Nigeria.

Keywords: Artificial Intelligence, Entrepreneurship Education, Economic Growth, Barriers and Enablers, Technology Integration, Tertiary Education.

Introduction

Artificial Intelligence (AI) is reshaping education, entrepreneurship and economic activity, offering avenues for innovation, productivity and skills enhancements. The transformation is significant for Nigeria as the country currently suffers from high youth unemployment, reliance on oil and the need for economic diversification. The expectation of entrepreneurship education is to produce entrepreneurial graduates that are able to create businesses and jobs, but this is not being matched by many tertiary institutions in Nigeria that still adopt conventional teaching methodologies which are not reflective of the demands of the current technological requirements (Issa et al., 2025; Wariowei & Ekankumo, 2025). Leaving no doubt, there has been evidence that AI can boost entrepreneurship education by enhancing business planning, critical thinking, creativity, market analysis and strategic adaptability (Adelabu et al., 2025; Okonkwo et al., 2025; Odugbesan et al., 2026).

Nevertheless, despite these opportunities, the integration of AI in entrepreneurship education is not yet significant in Nigeria. Previous research has highlighted that poor digital

infrastructure, lack of funding, low level of faculty AI literacy, outdated curricula, and weak institutional and policy systems are significant challenges (Bali et al., 2024; Igboke & Ogri, 2025; Shittu et al., 2024). On the other hand, curriculum restructuring, leadership of institutions, government funding, and university–industry collaboration have proven to be significant enablers (Boison, 2025; Adelakun & Mande, 2026). Nigeria’s scholarship, however, has mainly focussed on awareness, access, utilisation and institutional readiness for AI, with AI adoption as a key output and not focussing on the entrepreneurial skills created by the successful integration of AI in educational systems.

This review therefore argues for a paradigm shift from an AI-adoption perspective to an AI-enabled entrepreneurial human-capital development perspective. The critical issue is not merely whether tertiary institutions adopt AI, but whether its integration develops entrepreneurial capabilities such as innovation, opportunity recognition, strategic decision-making, employability and enterprise creation. This systematic literature review analyses the challenges and opportunities of AI integration in entrepreneurship training based on the Human Capital Theory (Schultz, 1961; Becker, 1964) and its implications for economic growth in Nigeria. It brings together evidence and builds a framework to demonstrate the link between educational and institutional factors and entrepreneurial human capital development, and their impact on Nigeria’s innovation, employment creation and economic diversification prospects for sustainable economic growth. Scholars have approached the definition of barriers from different angles, each reflecting distinct assumptions about where obstacles to change come from. Ertmer (1999) distinguishes between first-order barriers, which are external and institutional, covering limited access to technology, time, and resources, and second-order barriers, which are internal and personal, rooted in individual beliefs, confidence, and

teaching readiness, with both types interacting dynamically rather than operating in isolation. On the other hand, Hew and Brush (2007) treat barriers as a wider cluster of overlapping factors spanning resources, institutional conditions, attitudes, knowledge, and assessment pressures, all of which can simultaneously limit how technology is adopted in education. Differently, Kopcha (2012) locates barriers more firmly within the school environment, understanding them as systemic obstacles tied to access, professional development, time, and educator beliefs, arguing that institutional support can either ease or worsen these difficulties. Among these three perspectives, Ertmer's (1999) two-tier framework is the most fitting for this review because it separates systemic failures from individual level limitations, offering the kind of analytical clarity needed to examine AI integration in Nigerian entrepreneurship education, where poor infrastructure, low faculty AI literacy, and weak funding operate as layered challenges rather than a single, undifferentiated problem.

Goktas et al. (2009) treat enablers as the practical conditions and strategies that make technology integration achievable, pointing to clear technology plans, administrative support, and access to appropriate training materials as key facilitating factors, suggesting that enablers are largely institutional and can be deliberately planned for. Menon and Suresh (2022) on the other hand take a wider view, defining enablers as interacting factors that collectively promote technology adoption in higher education, including government initiatives, institutional commitment, and infrastructure readiness, arguing that these factors reinforce each other in a dynamic, multidirectional way rather than working in isolation. Also, but differently, Starks and Reich (2023) locate enablers at the level of structural, teacher, and student conditions that together create opportunities for technology enabled learning, shifting the focus toward the interplay of system wide and individual level factors. Among these

perspectives, Menon and Suresh's (2022) definition is the most fitting for this review because it recognises that enablers function as a system, which closely reflects the Nigerian context where AI integration in entrepreneurship education depends on the simultaneous alignment of policy support, institutional investment, faculty capacity, and curriculum reform rather than any single factor acting alone.

Artificial Intelligence (AI)

AI has been defined by scholars in ways that reflect different assumptions about what the technology is and what it is meant to do. McCarthy (2007) describes AI simply as the science and engineering of making intelligent machines and computer programs, a definition that stays close to the technical origins of the field and treats intelligence as something that can be deliberately designed and built. Baker et al. (2019) takes a broader view, defining AI as computers that perform cognitive tasks normally associated with human minds, particularly learning and problem solving, shifting the focus away from how AI is built and towards what it actually does, which makes it easier to see how these systems connect to human intellectual activity. Different from the others, Popenici and Kerr (2017) situate AI within an educational setting, understanding it as computing systems capable of performing tasks that typically require human intelligence while also adapting to new inputs and reshaping how institutions teach and how students learn. Among these perspectives, Baker et al.'s (2019) definition is the most fitting for this review because its emphasis on cognitive task performance links most naturally to the educational purposes AI serves in entrepreneurship education, where its value lies in supporting learning, simulating real-world problem-solving, and building the skills that Human Capital Theory connects to long term economic productivity.

Entrepreneurship Education

Mwasalwiba (2010) defines EE as an educational or training process designed to shape individuals' attitudes, behaviours, values, and intentions toward entrepreneurship as a career path, or to build a broader appreciation of the role entrepreneurship plays in society, placing attitudinal and behavioural change at the heart of the concept. Fayolle and Gailly (2008) approach EE through the lens of teaching models, arguing that it involves two connected levels- a clear understanding of what entrepreneurship is as a field of study, and a deliberate sense of what education should achieve for both students and educators, meaning that EE cannot be separated from the pedagogical thinking that shapes it. Differently, Neck and Greene (2011) define EE as the practice of teaching entrepreneurship as a method rather than a subject, where students move beyond simply learning about entrepreneurship and instead develop the habits of thinking, applying, and acting that real entrepreneurial practice demands. Among these perspectives, Mwasalwiba's (2010) definition is the most fitting for this review because its focus on attitude and behavioural change aligns with the outcomes that AI integration in Nigerian EE is expected to produce, namely graduates equipped with the entrepreneurial mindset that Human Capital Theory connects to long-term economic growth.

Economic Growth

Scholars have defined economic growth in ways that reflect different assumptions about what drives it and how it should be measured. Solow (1956) defines economic growth as the sustained rise in national output resulting from the combined contributions of capital accumulation, labour, and technological progress, arguing that technology is the primary engine of long-run growth since physical capital alone produces diminishing returns over time. On the other hand, Todaro and Smith (2003) take a broader view, defining

economic growth as the sustained increase in a country's output of goods and services, commonly measured by changes in Gross Domestic Product (GDP), while noting that output growth does not automatically improve living standards or reduce inequality, making it a necessary but insufficient condition for real development. Differently, Romer (1990) defines economic growth through an endogenous lens, arguing that long-run growth is driven primarily by the intentional accumulation of knowledge, innovation, and ideas generated by people responding to market incentives, rather than by external forces alone. Among these three perspectives, Romer's (1990) definition is the most fitting for this review because it directly connects investment in knowledge and human capacity to national economic outcomes, which closely reflects this review's core argument that improving the quality of AI integrated entrepreneurship education in Nigeria builds the kind of innovative human capital that drives long-term, self-sustaining economic growth.

Theoretical Framework

The study's theoretical underpinning for examining barriers and enablers to the integration of AI in entrepreneurship education and the implications for Nigeria's economic growth is Human Capital Theory. The Human Capital Theory was first introduced by Theodore Schultz (1961) and Gary Becker (1964) as a means to explaining the link between education and skills and economic growth. The concept was first suggested by Schultz (1961) in his address to the American Economic Association where he claimed that the factors relating to human abilities, and especially to the education of the population, contribute a large share to economic growth which cannot be explained by the growth in physical capital. Building on this, Becker (1964) provided detailed analysis and demonstrated the real and measurable returns to education and training at the individual and national levels. The bottom line of the theory is that the quality of the knowledge and skills

individuals gain from their education determines how they can be productive, innovative, and make contributions to an expanding economy. The theory has a major advantage in that it links directly to the national economic outcomes, thus providing a plain and useful perspective on the importance of quality education outside the classroom (Abrho & Weldeyohans, 2025). Nevertheless, the theory has been criticized as underemphasizing the role of structural constraints including inadequate infrastructure and institutional failures that may affect the economic pay-off of an education even if educational expenditures are increased (Sweetland, 1996).

Nevertheless, Human Capital Theory is the most appropriate theory for this review. Integrating AI in Nigeria is a positive step towards improving the quality of human capital being developed, especially in an increasingly populous nation where entrepreneurship education is expected to transform a vast demography of young people into productive entrepreneurs. The theory provides a good analytical foundation for this review to assess barriers and enablers, beyond just being technical and institutional barriers, as influences that strengthen or weaken the quality of the graduates entering the economy. The degrees of the influence of the barriers and enablers can be interpreted respectively as factors that lower and enhance the quality of entrepreneurial human capital produced: barriers like lack of digital infrastructure, lack of faculty expertise in AI and lack of funding act as pull factors, whereas enablers like policy support, curriculum change, and institutional investment act as push factors. This framework, therefore, covers the entire logic of this review, linking classroom-level issues to national economic implications and ultimately enabling the evaluation of the impact of AI integration, or not, on Nigeria's innovation potential, employment and long-term economic growth.

Methodology

Systematic Literature Review (SLR) research design was chosen for this study because it aimed to critically review the effects of the barriers and enablers of Artificial Intelligence (AI) in entrepreneurship education and implications for economic growth in Nigeria. The SLR approach was deemed suitable as it allows for the systematic identification, evaluation and synthesis of existing evidence on a research topic in a transparent and replicable manner (Tranfield et al., 2003; Snyder, 2019). The research uses secondary data sources from journal articles (peer reviewed), conference papers, policy publications, and institutional reports from 2020 to 2026. This time interval was chosen to reflect the latest advancements and the increasing use of AI in the fields of education and entrepreneurship. Search engine databases such as Google Scholar, Scopus, Web of Science, ScienceDirect, SpringerLink and ERIC were used to retrieve relevant literature. Relevant studies were identified by combining various terms such as Artificial Intelligence, Entrepreneurship Education, Artificial Intelligence Adoption, Digital Entrepreneurship, and Economic Growth with each other (Okoli, 2015). The selection process of studies was based on the PRISMA guidelines proposed by Moher et al. (2009). 89 studies were retrieved from the comprehensive search of selected databases. After reviewing titles and abstracts, 50 studies were eliminated for not meeting the goals of the study. The remaining 39 studies underwent full-text review, with 20 excluded for reasons impeding full assessment of the relevance to AI integration in entrepreneurship education, methodological flaws, duplication of findings, and incomplete data. Thus nineteen studies fulfilled the inclusion criteria and were included in the last review. The detailed selection process of the studies is shown in Figure 1.

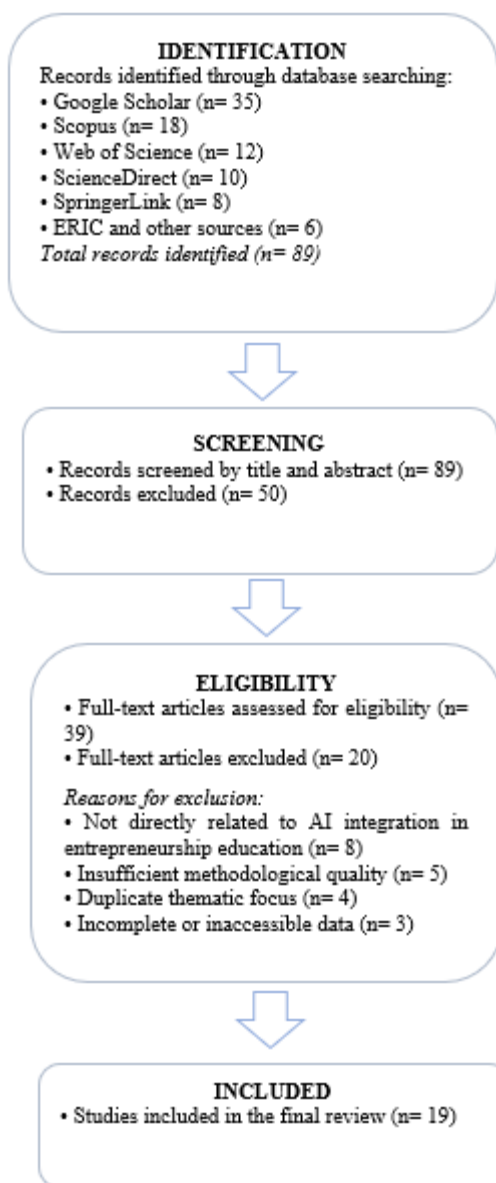


Figure 1: PRISMA Flow Diagram for Study Selection

Data from the selected studies were analysed using thematic analysis, which enabled the identification of key themes relating to barriers, enablers, and the economic implications of AI integration in entrepreneurship education (Braun & Clarke, 2006). Findings from the reviewed studies were synthesized and presented according to these themes.

4. Results

The thematic analysis of the 19 selected studies yielded four themes as given below.

Theme 1: Barriers to AI Integration in Entrepreneurship Education

The studies examined in Nigeria revealed that lack of digital infrastructure, inadequate funding, lack of access to AI technologies, poor internet connectivity and lack of training of educators were the major challenges to the integration of AI in entrepreneurship education. Infrastructure and financial constraints were found to be major constraints to the adoption of AI in tertiary institutions as noted by Olafare et al. (2025), Igboke and Ogri (2025), and Wariowei and Ekankumo (2025). Okonkwo et al. (2025) identified low use of both generative and collaborative AI teaching approach by business educators and Abdul-Rafiu et al. (2024) confirmed moderate level of awareness but low level of utilisation of AI tools among lecturers and learners. Issa et al. (2025) also noted that the lack of facilities, teachers' lack of ability and outdated learning material were also a constraint that hinders students' access to AI-related technology. The other challenge that was encountered was the cost of implementation, resistance to change, weak institutional support, and gaps in policy implementation (Danmaigoro & Ahmad, 2025; Wariowei & Ekankumo, 2025). The results indicate that these challenges are interconnected; with the lack of infrastructure and financial resources impacting the ability to access AI tools, the lack of training and outdated curriculum negatively

influencing the ability to effectively utilize AI in entrepreneurship learning.

Theme 2: Enablers of AI Integration in Entrepreneurship Education

Curriculum reform, teacher training, the enhancement of digital infrastructure, institutional support and collaboration with AI-related industries were identified as the primary drivers for AI integration. Olafare et al. (2025) pointed to the need for AI infrastructure, greater access to relevant technologies, and ongoing staff training, as well as technological infrastructure and staff development, respectively (Igboke and Ogri, 2025). Ukaike et al. (2026) concluded that the introduction of AI-related skills in the curriculum positively contributed to fostering adaptability of the workforce, innovation and entrepreneurship development. Likewise, Adelakun and Mande expressed that use of AI in learning environments improved practical problem solving and employability of the NEDO engineering graduates. (2026). In addition, collaboration was also included as an important enabler with Igrubia et al. (2025), Wariowei and Ekankumo (2025), and Onwubuya et al. (2025) all underscoring the need to strengthen partnerships between tertiary institutions, technology industries, and other stakeholders. Based on these findings, it is recognized that there is a need for coordinated investment in infrastructure, building curriculum, developing educator competencies and institutional collaboration in order to allow for effective integration of AI.

Theme 3: AI Integration and Entrepreneurial Human-Capital Development

Based on the studies reviewed, there are evidences that AI can play a role in the development of entrepreneurial knowledge, skills and capabilities. Adelabu et al. (2025) identified that AI component improved the learning of entrepreneurship

knowledge aspects especially planning and scheduling, knowledge representation, reasoning and problem solving. Okonkwo et al. (2025) mentioned generative and collaborative AI teaching models as helpful in building digital entrepreneurial competencies such as digital marketing, e-commerce, data analytics, or online business abilities. The result obtained by Onwubuya et al. (2025) revealed positive relationship between integration of machine learning with practical skill development ($r = 0.722$) and entrepreneurship cognitive development ($r = 0.673$). In addition, skills such as critical thinking, problem solving, creativity and workplace readiness were also identified as critical skills that can be enriched through AI-assisted Business Education by Emefiele (2025). Odugbesan et al. (2026) also revealed that AI knowledge and technological exposure improved the strategic thinking and cognitive adaptability of entrepreneurs in Nigeria. The results thus indicate that the importance of AI in entrepreneurship education is not just about its adoption, but also about its ability to build and nurture entrepreneurial skills, knowledge and adaptability for productive economic participation.

Theme 4: Implications of AI Integration for Economic Growth

The studied Nigerian researches were related to employability, productivity, enterprise performance and economic growth with the integration of AI and AI related entrepreneurial capabilities. Olafare et al. (2025) concluded that the use of Artificial Intelligence in Technical and Vocational Education and Training can boost employability, productivity, and skill acquisition, and Adelakun and Mande (2026) associated AI entrepreneurship education with creativity, practical problem-solving, and employability. At the enterprise level, Kalu-Okoro et al. (2025) revealed that implementation of AI led to better performance, efficiency in operations, customer engagement and market expansion. Mashi et al. (2024) also

found that the strategic use of AI boosted the competitive advantage of manufacturing businesses in South-West Nigeria, improved customer satisfaction and efficiency in their operations. On national level, Ochulor et al. (2026) reported that positive effect of AI on economic growth in Nigeria. In total, the findings indicate that the integration of AI can contribute to the economic growth of Nigeria by fostering the growth of relevant skills, enhanced employability, improved entrepreneurial capacity, and the performance and productivity of enterprises, thereby solidifying the link between entrepreneurship education, human capital development and Nigeria's overall economic development.

Conclusion

The paper employed systematic review method to identify the barriers and enablers to the integration of AI in entrepreneurship education and the effects on economic growth in Nigeria. The reviewed evidence highlights that the lack of digital infrastructure, lack of funding resources, lack of competence of educators in the application of AI, the lack of updated curricula and the lack of institutional support are major obstacles, with curriculum reform, faculty development, infrastructure improvement, institutional commitment and collaboration with industry being important enablers. More so, the synthesis reveals that the relevance of AI goes beyond its embrace in educational institutions to its ability to add to entrepreneurial knowledge, digital skills, problem-solving, strategic thinking, adaptability and employability. The broader economic significance of these capabilities is further evidenced on enterprise performance and economic outcomes. The review thus concludes that a transition from an AI-adoption thinking to an AI-enabled entrepreneurial human capital development thinking, which looks at the entrepreneurial development an AI contributes towards to measure the success of its introduction. These capabilities are important and through them entrepreneurship education can

play a significant role in innovation, enterprise creation, employment and sustainable economic growth in Nigeria.

Policy Recommendations

The Federal Government and the National Universities Commission (NUC) should increase the investment in tertiary institutions to provide reliable digital infrastructure and access to AI technologies. The NUC and appropriate institutional bodies should also encourage the mainstreaming of AI-related entrepreneurial skills into entrepreneurship and business education curricula. University management should have a continuous faculty development programme to boost faculty's practical ability in using AI tools for teaching, business problem solving and development of entrepreneurial skills. The curriculum should be directed more to the application of AI with emphasis on build up Nigeria's innovation and strategic thinking, digital entrepreneurship, etc. Lastly, the role of tertiary institutions will have to be enhanced as they partner with technology companies, business and entrepreneurship support organisations to link AI-assisted learning to entrepreneurial real world and labour market needs. These collectively should change the focus from the mere use of AI technologies to achieving their effective utilization in building entrepreneurial human capital that adds value in Nigeria's economic development.

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