PROSPECTS AND CHALLENGES OF THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN BUSINESS AND ENTREPRENEURSHIP EDUCATION IN NIGERIAN TERTIARY INSTITUTIONS

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Abstract

This paper explores the prospects and challenges of applying Artificial Intelligence (AI) to business and entrepreneurship education. It focused on global trends while paying attention to practical implications for educators, students, researchers, and policymakers for the Nigerian educational system. The integration of Artificial Intelligence (AI) generative and analytical tools in business and entrepreneurship education has emerged as a transformative force with vast potential to enhance teaching, learning, and research. These AI tools offer numerous prospects, including personalised learning, intelligent tutoring systems, automated assessment, data-driven curriculum development, and entrepreneurial forecasting through predictive analytics. These technologies are revolutionising how students acquire business skills, develop innovative mindsets, and respond to dynamic market environments. The paper is a narrative review of literature published between 2020 and 2025 that critically examines current tools such as chatbots, machine learning algorithms, natural language processing, and generative AI platforms, evaluating their effectiveness in business and entrepreneurship instruction. The study synthesises global and Nigerian research on AI in business education. Cases in global scenarios highlighted both successful applications and the barriers to widespread adoption. However, significant challenges persist. These include ethical concerns, data privacy issues, poor funding as reflected in low and inadequate power supply and digital infrastructure, and a lack of technical expertise among educators. The study concluded with strategic recommendations for integrating AI literacy among faculty members, providing infrastructures on digital devices and power supply, ensuring AI literacy and use among students, and fostering further research on AI among scholars in business and entrepreneurship education.

Keywords: Prospects, Challenges, Artificial intelligence, Business education, entrepreneurship education

Introduction

In recent times, the advent and development of Artificial Intelligence (AI) have had a landmark transformation on all societies and on all fields of education, including business and entrepreneurship education. AI has been able to redefine the functions of machines across all facets of education by enabling machines to learn concepts and make decisions, thereby enhancing their efficacy in solving complex problems in education generally and in business and entrepreneurship education in particular. This achievement has had significant implications for educational outcomes and has given

business and entrepreneurship education a foothold for transformative innovations in both the classroom and the world of work. In Nigerian tertiary institutions, AI tools are being used for general educational purposes, such as improving teaching and learning through personalised teaching and adaptive platforms, and to enhance administrative efficiency through automated processes for admissions, registration, and grading. Other general applications of AI tools in Nigerian tertiary institutions include advanced data analysis for student performance tracking, the use of virtual labs for practical learning, and the use of AI for exam malpractice detection (Temitope et al., 2025). In the field of business and entrepreneurship education, it has been reported that, in addition to the general application of AI in education, tertiary institutions in Nigeria have leveraged AI tools to develop students' AI-related skills for the modern workforce (Enwedo, 2025). While these advancements in the operational paradigm in business and entrepreneurship education may hold promise, they also entail accompanying challenges that must be surmounted (Rahimi & Akbari, 2023; Mumi et al., 2025; Ocen et al., 2025).

As part of its 2030 agenda for sustainable development, the United Nations (UN, 2015) noted that AI holds the potential to address major educational challenges and to redefine teaching and learning practices. This assertion is particularly aimed at advancing Sustainable Development Goal 4 on quality education by the year 2030. In the context of business and entrepreneurship education, AI holds promising opportunities that tend to brighten the future of these fields such as personalized learning, data-driven insights, and innovative simulation tools. However, despite the potential positive outcomes of these opportunities, they also come with challenges, including new ethical considerations, uncertainty regarding access and equity, and concerns about academic integrity (Hwang et al., 2020; Ali et al., 2024; Machucho & Ortiz, 2025). These challenges are expected in developing countries like Nigeria, where there are already existing problems related to ethics, integrity, infrastructural deficit, power problems, and poor data management (Nonum & Nonum, 2023; Olise, 2025)

Application of Artificial Intelligence in Business Education

One central area in which AI can be applied to business education is personalised learning. The introduction of personalised learning can positively change the landscape of business education. This approach, which differs from the traditional approach of using a uniform learning strategy for all learners, recognises that each student has unique strengths, weaknesses, learning styles, and career aspirations. Consequently, learning can be tailored to personal educational experiences and individual needs, which has the potential of significantly enhancing the effectiveness and engagement of business education.

Key aspects of personalized learning in business education include AI-powered tools, adaptive learning platforms, curated learning paths, data-driven insights, mentorship and coaching, and real-world applications (Surugiu et al., 2024). AI-driven chatbots and virtual assistants can provide academic support. These tools can answer student questions, guide learners through case studies, or even role-play business negotiations, thereby unlocking creativity and reinforcing concepts. Together, these applications help simulate real-world business contexts and keep students engaged (Alabi, 2022; Zhu & Zhang, 2022). Adaptive learning platforms use technology to assess student performance in real-time, adjusting the difficulty and content of coursework to match individual progress. This ensures that students are constantly challenged yet not overwhelmed, thereby optimising their learning trajectory. In the case of curated learning paths, personalised learning allows students to choose paths aligned with their specific career goals. This flexibility fosters a sense of ownership and motivation, leading to improved outcomes (Al-Mamary, 2025).

In addition, data-driven insights are used to track students' performance and preferences, allowing educators to provide targeted feedback and support. This data-driven approach helps identify areas where students might need extra help or where the curriculum could be improved (Rahimi & Akbari, 2023). In mentorship and coaching, personalised learning often involves close collaboration between students and mentors or coaches who provide individualised guidance and support. This personalised attention helps students navigate challenges and stay focused on their goals. Furthermore, Real-world applications of personalised learning emphasise the practical application of knowledge through case studies, simulations, and real-world projects. This helps students develop valuable skills and experience, preparing them for success in the business world (Tominc & Rožman, 2023; Widya et al., 2025).

Drawing from the diverse applications of personalised learning in business education, the following benefits can become notable (Bai et al., 2022; Bell & Bell, 2023; Vecchiarini & Somià, 2023; Iwerima & Bupo, 2024; Solórzano et al., 2024; Bassey et al., 2025; Ocen et al., 2025; Vieriu & Petrea, 2025):

1. Improved student outcomes: Personalised learning experiences lead to better knowledge retention, higher grades, and increased overall student satisfaction.
2. Enhanced Engagement and Motivation: Students can become more engaged when they feel their learning is relevant and meaningful to their individual aspirations.
3. Better Preparation for the Workplace: Personalised learning helps students develop critical thinking, problem-solving, and collaboration skills, all of which are highly valued in the modern workplace.
4. Increased Career Success: By aligning education with individual career goals, personalised learning helps students make more informed career choices and achieve greater career success.

When applied effectively, personalised learning holds promise for business education. As technology continues to advance, customised learning will become even more sophisticated and integrated into business education. With expected further advancements in AI-powered learning platforms and more sophisticated data analytics, business education will also see an even greater emphasis on personalised mentorship and coaching. The future of business education lies in embracing customised learning to create a more effective, engaging, and impactful learning experience for all students (Vecchiarini & Somià, 2023; Iwerima & Bupo, 2024; Solórzano et al., 2024).

Application of Artificial Intelligence in Entrepreneurship Education

AI tools are increasingly incorporated into entrepreneurship education to support creativity and decision-making. Generative AI chatbots such as ChatGPT are currently being used as brainstorming assistants in startup and venture creation courses. Research shows that ChatGPT can play a transformative role in entrepreneurial tasks, thereby helping students generate business ideas, craft business models, write plans, or simulate customer interviews (Chen et al., 2024). Studies have also shown that ChatGPT supported creative thinking (Mohamed et al., 2024). It is on record that entrepreneurship educators are finding ways to use such tools as complements to traditional teaching (Mumi et al., 2025; Park et al., 2025). These scenarios also apply to Nigerian tertiary institutions where AI tools are gradually being applied to educational settings in addressing educational problems in general and business and entrepreneurship issues of education in particular (Nwile et al., 2025; Temitope et al., 2025)

In addition, AI tools can generate complete essays on entrepreneurship topics, prompting faculty to reconsider assessment methods. This development has prompted some educators to gradually shift

from take-home assignments to in-class presentations or projects to ensure students demonstrate understanding through original work.

AI Tools and Technologies in Business and Entrepreneurship Education

As the development and application of AI continue to expand, a wide range of AI tools and technologies are finding applications in business and entrepreneurship education (Giuggioli & Pellegrini, 2023; Ali et al., 2024). Some of these include:

1. Large Language Models (LLMs): Generative models like ChatGPT, GPT-4, Microsoft Copilot, and Google Gemini produce human-like text and can generate explanations, summaries, or creative prompts for business topics. Educators can use them to create discussion questions, case variations, or even draft exam questions.
2. Intelligent Tutoring Systems: AI-driven tutoring platforms such as Carnegie Learning, Knewton Alta, provide individualised instruction and practice in quantitative and analytical subjects. They adapt problem sets in areas like finance or operations management to each student's skill level.
3. Adaptive Learning Platforms: Systems such as DreamBox or Smart Sparrow monitor student responses and adjust lessons in real time.
4. Automated Grading and Feedback: Tools like Gradescope are used for structured assignments, and plagiarism detectors like Turnitin automate evaluation. Natural Language Processing (NLP)-based software can assess essays on business strategy or ethical reasoning for coherence and completeness.
5. Chatbots and Virtual Assistants: Domain-specific chatbots, such as those built on GPT or similar LLMs, can answer student questions about course material at any time. Mainstay is an example of an AI tutor used in classrooms. Such a tool can also simulate customer service interactions or provide prompts for negotiation exercises.
6. Learning Analytics Software: Platforms like Knewton Alta and Edthena use AI to analyse learning data. They can highlight which business concepts most students miss, allowing instructors to intervene. Analytics tools may also predict which students are at risk of falling behind.
7. Immersive Virtual Reality/Augmented Reality Simulations: Virtual and augmented reality applications create interactive entrepreneurship scenarios. Virtual Reality business games can be used to immerse students in a virtual marketplace or startup lab. Research suggests a promising synergy between AI and extended reality (XR) in entrepreneurship simulation games, enabling scenarios to adapt dynamically to students' decisions (Alqahtani, 2023).
8. AI Content Creation Tools: Applications such as MagicSchool AI and Eduaide.ai help instructors generate lesson plans, case studies, or quiz questions from raw text. In an entrepreneurship course, an instructor can use AI to automatically generate a related assignment based on a business article.
9. Collaborative AI Tools: Some platforms enable group projects with AI assistance. This can be applied when teams of students use AI-driven mind-mapping tools or brainstorming assistants to organise ideas during startup pitch sessions.
10. Administrative AI: Beyond the classroom, AI can be used to streamline course scheduling, predict enrollment, and manage educational resources. Chatbots may also assist with admissions or campus services, indirectly affecting the academic environment (Liu & Yushchik, 2024; Nicholas, 2025).

The variety of these tools illustrates the breadth and depth of AI technology in education. While some of the tools are cross-disciplinary, others are specifically tailored for business and entrepreneurship education contexts.

Global Scenarios Vis-à-Vis Nigerian Tertiary Institutions

Several institutions worldwide have begun integrating AI into their business and entrepreneurship programmes. For instance, ESMT Berlin has launched a custom AI chatbot built on OpenAI's GPT technology, embedded directly in its learning management system (Giuggioli & Pellegrini, 2023; Uriarte et al., 2025). The platform provides separate interfaces for students and faculty where instructors can use the AI to brainstorm course ideas and develop teaching materials. In contrast, students have a dedicated chatbot that offers study support. Similarly, the University of Southern California (USC) Marshall School of Business convened faculty from across departments to explore the integration of generative AI. A case study from USC describes a framework for AI integration that spans accounting, communication, marketing, and other disciplines (Park et al., 2025). The approach emphasises teaching students AI literacy and critical thinking alongside the use of AI tools. Instructors incorporate AI as a complementary aid while guiding students to make human judgments about the AI's output. The USC experience highlights the importance of ethical considerations and setting clear limits on AI use. These examples show that top business schools are already experimenting with AI-driven pedagogies, treating AI as a collaborator in learning rather than a replacement for instruction.

In addition, several Massive Open Online Courses (MOOCs) now use AI for automated grading and feedback. Some entrepreneurship incubators incorporate AI-driven market analysis tools for students (Mumi et al., 2025). It is on record that in China and India, universities are launching AI-focused entrepreneurship labs in which students use AI to analyse business data or build intelligent startups (Mohamed et al., 2024). While these global applications of AI in education can be found in the literature, there has been little progress in this direction in Nigerian tertiary institutions (Chen et al., 2024). Studies have shown that even the mere understanding of AI applications in Nigerian tertiary institutions, particularly in business and entrepreneurship education, remains shallow (Alqahtani, 2023). In addition, what seems to be operational on a minimal scale is the use of Large Language Models (LLMs) such as ChatGPT, Microsoft Copilot, and Google Gemini, which are used by instructors and students in generating explanations, summaries, and creative prompts for topics in business and entrepreneurship education (Ocen et al., 2025). Advanced applications of AI tools in business and entrepreneurship education, as observed in developed countries, are still not fully embraced in Nigerian tertiary institutions (Bassey et al., 2025).

Prospects and Benefits of AI Integration in Business and Entrepreneurship Education

Literature has shown that AI offers numerous potential prospects and benefits for business and entrepreneurship education when intelligently deployed. Such prospects and benefits can also be reaped in Nigerian tertiary institutions when AI is amply applied to business and entrepreneurship education (Vecchiarini & Somià, 2023; Iwerima & Bupo, 2024; Solórzano et al., 2024; Vieriu & Petrea, 2025). Some of these prospects and benefits include:

1. Personalised Learning and Support: AI can tailor curricula to individual learning styles and paces, helping each student master foundational concepts before moving on. This ensures weaker students get extra help and stronger students stay challenged. When applied to business and entrepreneurship education in Nigerian tertiary institutions, this will significantly reduce academic and practical disparities among students and teachers while improving Nigeria's global rating in terms of quality of students, teachers, and programmes.
2. Enhanced Engagement: Interactive tools and simulations, including AI-driven games and VR scenarios, make learning more immersive. The application of these tools to business and entrepreneurship education in Nigerian tertiary institutions can enable students to gain hands-on experience in a risk-free environment, thereby boosting motivation and retention of material.

3. Improved Learning Outcomes: By providing immediate, targeted feedback and adaptive resources, AI helps students achieve learning objectives more efficiently. This can be a positive boost for business and entrepreneurship education in Nigerian tertiary institutions.
4. Access and Inclusivity: AI-driven translation and tutoring tools can overcome language barriers and support diverse learning needs. This can help underserved learners in business and entrepreneurship education in Nigerian tertiary institutions.
5. Efficiency for Educators: Automation of grading, scheduling, and administrative tasks allows instructors to devote more time to mentoring, curriculum development, and research. This can improve the overall quality of business and entrepreneurship education in Nigerian tertiary institutions while reducing workload.
6. Data-Driven Decision Making: Analysis of educational data through AI yields actionable insights. Platforms like Knewton Alta show how AI tracks student performance across various metrics, helping teachers identify learning gaps and tailor instruction. Such analytics support continuous curriculum improvement, which can be used to improve business and entrepreneurship education in Nigerian tertiary institutions
7. Fostering Creativity and Innovation: Generative AI can spark new ideas in business and entrepreneurship education projects, amplifying students' creativity. AI-generated brainstorming can help students consider novel business models or marketing strategies. This can create opportunities for students and teachers alike in business and entrepreneurship education in Nigerian tertiary institutions.
8. Global Collaboration: Online AI-driven platforms enable collaboration across borders. Students from different tertiary institutions in Nigeria and across the globe can work together using shared AI tools, preparing them for the interconnected business and entrepreneurial world.

These prospects suggest a transformative impact. When implemented thoughtfully, AI can enrich pedagogy and help prepare students to excel in an AI-influenced economy.

Challenges and Limitations of Integrating AI in Business and Entrepreneurship Education

Despite its numerous and promising prospects and benefits, the integration of AI into business and entrepreneurship education in Nigerian tertiary institutions may face significant challenges that could limit progress (Liu & Yushchik, 2024; Nicholas, 2025). Some of these include:

1. Digital and Power Access: Poor and unequal access to technology and power supply can exacerbate educational inequalities. Students or institutions without high-speed internet, modern devices, or an adequate power supply may not benefit from AI-enhanced resources (Ali et al., 2024).
2. Academic Integrity and Misuse: AI tools can generate complete essays or answers to issues in business and entrepreneurship education. Students have been known to use AI to generate responses to academic work. This raises concerns about plagiarism and cheating. Educators worry about verifying the originality of student work. Such misuse threatens the reliability of traditional assessments.
3. Quality of Content: Being an experimental project, as often displayed in some AI tools, AI models can sometimes produce inaccurate or misleading information (Alabi, 2022) because they lack proper understanding. Relying on AI outputs without critical evaluation can impair learning (Ali et al., 2024)
4. Bias and Ethics: AI systems may perpetuate biases present in their training data. For instance, a generative AI trained on biased sales data might suggest unfair pricing strategies. Ensuring fairness and transparency in AI is an ongoing concern. Business schools are integrating AI ethics into curricula, but developing unbiased educational AI tools remains a challenge (Ocen et al.,

2025). Such problems can be more challenging in Nigerian settings where issues of trust are already a problem.

5. Teacher Limited AI Skills: Studies have shown that many educators in Nigerian tertiary institutions have limited experience with AI tools. Without adequate training, teachers may struggle to integrate AI into their pedagogy. Consequently, professional development programs are needed to help instructors use AI effectively and understand its limitations (Mumi et al., 2025; Zhu & Zhang, 2022).
6. Curriculum and Policy Limitations: Given that education systems often move more slowly than technology, many curricula, standards, educational policies, and exams were not designed with AI in mind. Consequently, schools must revise assessment methods to ensure meaningful evaluation in an AI era. Policy and accreditation bodies also need frameworks to guide the use of AI in classrooms.
7. Over-Reliance on Technology: The increase in the use of AI has heightened the risk that students might become overly reliant on AI, thereby neglecting foundational skills. To this end, educators must balance AI assistance with activities that develop human skills such as critical thinking, creativity, and teamwork (Tominc & Rožman, 2023).

These challenges point to the blunt reality that, despite the huge benefits of deploying AI in business and entrepreneurship education in Nigerian tertiary institutions, concerted efforts must be made to ensure that all possible limitations are adequately addressed for the expected prospects to become a reality.

Future Trends and Directions in the Integration of AI in Business and Entrepreneurship Education

In time to come, AI is expected to become even more deeply integrated into business and entrepreneurship education. Advances in generative AI and large language models will likely produce more sophisticated teaching assistants and automated content creation. Immersive technologies may also advance: virtual and augmented reality could create classrooms where students collaborate on global startups in real time. There is growing interest in using AI to analyse educational research data itself, enabling large-scale meta-analyses of teaching methods and outcomes. Such interest is already being observed in Nigerian tertiary institutions, where instructors and students are exploring the application of AI in diverse educational settings and in Business and entrepreneurial education (Widya et al., 2025).

In addition, business schools are beginning to treat AI literacy as a core competency for future managers and entrepreneurs (Liu & Yushchik, 2024). Institutions that integrate AI thoughtfully, enhancing learning while managing risks, will likely lead in educational innovation in the near future. Ultimately, the future promises both new opportunities and new questions. Ongoing research and dialogue will be needed to understand how AI reshapes entrepreneurship learning, to measure its impact on skills such as innovation, and to ensure AI benefits all learners globally. Drawing from the foregoing, there is a need for tertiary institutions in Nigeria to aggressively harness and deploy AI across all their business and entrepreneurship education programmes to become key players in the use of AI in the near future (Nicholas, 2025).

Implications of Integrating AI in Business and Entrepreneurship Education for Stakeholders

The rise of AI in business and entrepreneurship education has implications for all stakeholders in the field, which, when implemented, will spell positive outcomes for all. These include:

- Educators: Teachers and other instructors will need training and support to adopt AI tools effectively. Faculty development programs should focus on both technical skills and new

pedagogical strategies. Instructors will also shift roles from sole knowledge providers to facilitators who guide students in using AI critically and creatively.

- Policymakers and Administrators: School leaders, accreditation agencies, and governments must develop policies and standards for responsible AI use. This includes guidelines on data privacy, security, and equitable access. Policymakers should allocate funding for infrastructure such as broadband, devices, and an adequate and constant power supply for research on AI in education.
- Students: Learners must build digital and AI literacy to use these tools effectively. While AI can enhance their work, students also need to learn to evaluate AI outputs critically. Soft skills like problem-solving, creativity, and ethical reasoning remain crucial. In preparing for the job market, students should understand how AI is used in their industries and cultivate skills that complement AI.
- Researchers: The intersection of AI and education is a promising area for investigation. Scholars in business and entrepreneurship education can further interrogate the potential applications of AI in the field. Researchers must design rigorous studies to evaluate AI's impact.

By engaging these stakeholders, the educational community can navigate AI's impact together, ensuring that technology enhances learning without compromising core academic values.

Conclusion

In conclusion, it has been amply demonstrated that the benefits of deploying AI in business and entrepreneurship education at Nigerian tertiary institutions are far-reaching. However, the extent to which these gains can be achieved will depend on the extent to which identified challenges related to infrastructural reforms, faculty competence, and policy coherence can be surmounted.

Suggestions

In light of the findings of the conclusion drawn from this study, the following suggestions are deemed appropriate:

1. Nigerian tertiary institutions must develop programs that focus on both technical skills and new pedagogical strategies to keep faculty members abreast with current trends in AI use and applications, particularly in business and entrepreneurship education.
2. Policymakers and administrators must develop policies, standards, and guidelines for responsible AI use, such as data privacy, security, and equitable access.
3. Policymakers and administrators should allocate funding for infrastructure such as broadband, devices, and an adequate and constant power supply for research on AI in education.
4. Learners must build digital and AI literacy to use AI tools effectively.
5. Researchers in business and entrepreneurship education should further interrogate all possible applications of AI to this field to broaden the knowledge base on AI.

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