The Role of Artificial Intelligence and Science in Entrepreneurship in Nigeria

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Abstract- ***This Paper explores the transformative impact of artificial impact intelligence (AI) and scientific advancements on entrepreneurship. AI technologies such as machine learning and natural language processing, enable entrepreneurs to innovate, optimize business processes and make data driven decisions. Scientific research and development drive technological breakthrough, creating new opportunities for entrepreneurial ventures. The intersection of AI and science fosters innovation ecosystems, facilitating the growth of startups and small busiesses. This study examines the applications, benefits and challenges of integrating AI and science in entrepreneurship, highlighting the potential for increased efficiency, competitiveness and economic growth.***

Index Terms- ***Artificial intelligence, Science, Entrepreneurship, Innovation, Technology, Business Growth.***

I. BACKGROUND

Entrepreneurship plays s vital role in driving economic growth, innovation and job creation in Nigeria, particularly in Abia State. However, entrepreneurs in Abia State face numerous challenges, including limited access to funding, inadequate infrastructure, and lack of technological innovation. The integration of Artificial Intelligence (AI) and science in entrepreneurship can potentially address these challenges and unlock new opportunities for economic development.

Abia State located in the southeastern region of Nigeria is known for its rich entrepreneurial spirit and innovative culture. No wander Aba, a major city in Abia State is regarded as "The Japan of Africa". Despite these strengths, the state still grapples with high unemployment rates, limited economic opportunities and inadequate technological infrastructure. The application of AI and science in entrepreneurship can help bridge the gaps by enhancing business processes, improving decision making and fostering innovation.

Globally, AI and science are transforming industries and revolutionizing the way businesses operate. In Nigeria, the adoption of AI and science in entrepreneurship is still in its infancy, but holds immense potential for driving economic growth, improving productivity and enhancing competitiveness. By leveraging AI and science, entrepreneurs in Abia State can develop innovative solutions, optimize business operations, and access new markets, ultimately contributing to the state's economic development.

This study aims to explore the role of AI and science in entrepreneurship in Abia State Nigeria with a focus on identifying opportunities, challenges and potential solutions. By examining the intersection of AI, science, and entrepreneurship in Abia State, this research seeks to provide insight that can inform policy, practice and future research in this area.

Research questions:

1. What is the current state of AI and science adoption in entrepreneurship in Abia State?
2. How do AI and science contribute to entrepreneurial success in Abia State.
3. What are the challenges and barriers to adopting AI and science in entrepreneurship in Abia State?

4. How can AI and science be leveraged to drive innovation and economic growth I Abia State?
5. What policies and strategies can be implemented to support the adoption and integration of AI and science in entrepreneurship in Abia State.

Research Objectives:
1. To investigate current level of AI and science adoption in entrepreneurship in Abia State.
2. To examine the impact of AI and science on entrepreneurial success in Abia State.
3. To identify the challenges and barriers to adopting AI and science in entrepreneurship in Abia State.
4. To explore opportunities for leveraging AI and science to drive innovation and economic growth in Abia State.
5. To make recommendations for policy makers, entrepreneurs and stakeholders on how to support the adoption and integration of AI and science in entrepreneurship in Abia State.

Specific Objectives:
1. To survey entrepreneurs in Abia State on their awareness and adoption of AI and science in their business.
2. To conduct case studies of successful AI and science driven entrepreneurial ventures in Abia State.
3. To identify best practices and lessons learned from other regions or countries that have successfully integrated AI and science in entrepreneurship.
4. To develop a framework for integrating AI and science in entrepreneurship in Abia State.

Significance of the Study:
The importance of this research work cannot be over emphasized. It holds significant importance for various reasons such as:

- Provision of insights to driving economic growth, improving productivity and enhancing competitiveness.
- Fostering innovation leading to development of new products, services and business models.
- Identifying factors that contribute to entrepreneurial success, enabling policy makers and entrepreneurs to make informed decisions.
- Provision of insights into the role of AI and science in human capital development especially in the context of entrepreneurship education and training.
- Informing policy decisions aimed at promoting AI adoption, innovation and entrepreneurship.
- Identifying opportunities to gain competitive advantage, driving growth and job creation among others.

Statement of Hypothesis
H_0: There is no significant difference in Entrepreneurial success when AI and Science is adopted and when they are not adopted.
H1: There is a significant difference in Entrepreneurial success when AI and Science are adopted and when they are not adopted.

II. LITERATURE REVIEW

This section comprises of the overview (review of existing literature on the topic), the theoretical framework and the gaps in existing research works which this research work can address.

Overview
Afunugo K.N and Nwangwuchu G.C (2025) 'Shaping Nigeria's Future: Leveraging Artificial Intelligence, Entrepreneurship and faith for ethical leadership in a globalized world', explores the potential of AI, entrepreneurship and faith to drive ethical leadership in Nigeria.

Abubakar U etal (2025) 'Reimagining Edupreneurship with AI Technologies: Pathways to modern Educational Excellence in Nigerian Tertiary Institutions", highlights the role of AI in enhancing educational excellence in Nigerian Universities.

Wariowei E. R and Banabo. E (2025) 'Artificial Intelligence and entrepreneurship education in south-south Nigeria' emphasizes the need for incorporation of AI in entrepreneurship education.

Okoro.C.C (2021)'Artificial Intelligence and Entrepreneurship: A systematic review 'emphasizes the need for creation of awareness on the benefits of AI in entrepreneurship.

Eneh. O.C (2019)'Science, technology and innovation in Nigeria: Challenges and prospects', encourages government to invest in science and technology to enable transition to technological society.

Ojo.A.O (2020).'Entrepreneurship and innovation in Nigeria: The role of science and technology' reveals

that there can't be innovation in entrepreneurship if there is no access to science and technoilogy.

Artificial Intelligence is gradually embraced in Nigerians though by few. The founder of Awarri, Silas Adekunle is a pioneer in AI and robotics known for creating the world's first gaming robot that combines AI with augmented reality. Success Ojo, founder of GMind AI is a leading advocate for AI accessibility in education, particularly in underserved communities. Adebayo Alonge, co-founder and CEO of RxAII, is revolutionizing healthcare in Africa through AI powered solutions.

Theoretical Framework

The framework integrates various theories to understand the role of AI and science in entrepreneurship in Nigeria.

The Resource-Based View (RBV) Theory

- Key Idea: Firms gain competitive advantage through unique resources and capabilities.
- Application: AI and scientific knowledge as a valuable resource for Nigerian entrepreneurs.

The Dynamic Capabilities Theory

- Key Idea: Firms need to adapt and innovate stay competitive.
- Application: AI and science enable Nigerian entrepreneurs to develop dynamic capabilities.

Innovation Diffusion Theory

- Key Idea: New ideas and technologies spread through social systems.
- Application: AI and scientific knowledge diffusion in Nigerian entrepreneurial ecosystem.

Entrepreneurial Orientation Theory

- Key Idea: Entrepreneurial firms exhibit innovativeness, proactivenrss and risk taking.
- Application: AI and science enhance entrepreneurial orientation among Nigerian entrepreneurs.

Institutional Theory

- Key Idea: Institutions shape entrepreneurial activities.
- Application: Nigerian institutions influence AI and science adoption.

Gaps to Address

There are gaps in existing research which this research work can address. This include;

- Shortage of skilled professionals in AI, data science and machine learning, making it challenging to build and sustain AI projects.
- High technology cost which makes it difficult for small and medium enterprises (SMEs) to afford AI technologies hindering adoption and implementation.
- Infrastructural challenges such as limited power supply, internet and advanced technologies, restricting AI adoption particularly in rural areas.
- Poor data quality and quantity as a result of the fact that many businesses operate with paper-based systems or disconnected digital tools creating data silos that hamper AI implementation.
- Ethical concerns in the sense that AI adoption raises questions about data privacy, algorithm bias, and job displacement requiring careful regulation.
- Lack of awareness in the sense that many businesses ars not aware of AI's potential benefits and applications.
- Insufficient government support and policies hindering AI adoption and implementation.

III. METHODOLOGY

This section discusses the research design, the method of data collection sampling techniques and the method of data analysis.

Research Design

The research adopts mixed-methods design which is a combination of quantitative and qualitative data. A survey is conducted among Abia State entrepreneurs, startups and businesses to gather data on AI adoption, challenges and opportunities. This gives quantitative data. For the qualitative data, expert interviews is conducted with AI experts, entrepreneurs and policy makers to gain deeper insight into the topic.

Data Collection

The survey method is adopted basically the use of questionnaire for collection of quantitative data from a sample of participants on AI adoption, science and technology, business growth rate, job creation, innovation output and so on. On the other hand, the interview method is adopted for collection of qualitative data from a sample of participants on

perception, experience, challenges, opportunities, best practices and so on.

Sampling Techniques

Simple random sampling is used to select a sample of fifty firms from list of numerous firms in the state for quantitative data whereas the purposive sampling is used to select participants from which qualitative data is collected.

Methods of Data Analysis

The mean and Standard deviation is used to test level of AI adoption and variability among entrepreneurs respectively. Multiple regression analysis is used to examine the relationship between the dependent variable (Entrepreneurial Success) and the independent variables (AI adoption and Science and technology). The Analysis of Variance (ANOVA) is used to test whether or not there in entrepreneurial success when AI and Science is adopted. The statistical software SPSS is used to analyze the quantitative data while NVivo, a software that analyzes text and voice data from various sources such as interviews, surveys and focus groups is used to analyze the qualitative data.

IV. RESULTS

Table 1
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
AI adoption	50	1.00	10.00	3.72	3.20
Valid N (listwise)	50				

Table 2
Multiple Regression Analysis
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.12	4.30		4.389	.003
	AI adoption	4.53	0.31	.996	4.834	.002
	Science and Technology	3.21	0.17	.015	.074	.943

a. Dependent Variable: Entrepreneurial Success

b Independent Variables: AI adoption (X_1), Science and Technology (X_2)

Regression Equation

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2$

Table 3
ANOVA

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Adoption of AI and Science	1685.835	2	842.918	91.957	.00001
Residual	64.165	7	9.166		
Total	1750.000	9			

NVivo Coding

Table 4
Coding Stripes

Nodes	Description	Sources	References
Perception of AI	Perception of AI among entrepreneurs and policy makers	10	50

Challenges in AI adoption	Challenges faced by entrepreneurs in adopting AI	8	30
Opportunities of AI	Opportunities of AI in entrepreneurship	12	60
Role of science and technology	The role of science and technology in entrepreneurship	9	40

Node Hierarchy
Perception of AI
- Positive perception
- Negative perception

Challenges in AI adoption
- Infrastructure
- Funding
- Talent acquisition

Opportunities of AI
- Innovation
- Job creation
- Economic growth

Role of Science and Technology
- Importance of R&D
- Collaboration between academia and industry

V. DISCUSSION

Table 1 shows the mean and standard deviation of AI adoption measured on a scale of 1-10 to be 3.72 1nd 3.20 respectively. The mean is low and the standard deviation is high. The implication is that there is low adoption of AI by the entrepreneurs. On the other hand, the standard deviation is high which is an indication that there is high variability in adoption scores.

Table 2 shows that the coefficient of both AI adoption (β_1) and that of Science (β_2) are all positive and determine what the value of Entrepreneurial success will be. This is clearly seen in the regression equation. By implication, the success entrepreneurs that adopted AI and Science and technology enjoy is as a result of the adoption of AI and Science in their business.

Table 3 shows the test statistic (F) to be 91.957 whereas the critical region otherwise called the p-value (Sig) is 0.00001. According to Decision rule: "Reject H_0 if F > Sig otherwise accept H_0", the value of F is very much greater than the p-value (Sig) which implies the rejection of H_0 and acceptance of H_1. Therefore, it can convincingly be said that there is a significant difference in Entrepreneurial success when AI and Science are adopted in a business and when they are not adopted.

In Table 4, "Source" refers to the number of distinct sources (interviews, surveys, documents) that contain the coded theme. In other words, it is the number of individual sources that mention or discuss the particular theme or concept whereas "Reference "refers to the total number of times the codded theme or node is mentioned across all sources.in the table 4, perception of AI was mentioned 50 times in 10 different interviews. That is how it goes for other concepts considered in the Table. The node hierarchy shows that positive perception leads the negative perception in the interviews. Infrastructure leads funding and talent acquisition in the challenges in AI adoption. Innovation leads job creation and economic growth in opportunities of AI. Importance of Research and Development (R&D) leads collaboration between academia and industry in the role of science and technology.

CONCLUSION

This study highlights the crucial role of artificial intelligence and science in entrepreneurship in Abia State Nigeria. The findings suggest that AI adoption in entrepreneurship is not encouraging and should be encouraged because according to the findings, it will drive innovation, improve efficiency and enhance entrepreneurial success. However challenges such as infrastructure, funding and talent acquisition needs to be addressed to facilitate widespread AI adoption. The study also underscores the importance of science and technology in driving entrepreneurship and economic growth. To harness the potential of AI and science, Abia state entrepreneurs, policy makers and stakeholders must collaborate create enabling environment, invest in research and development and develop relevant skills. By doing so, Abia State and Nigeria as a whole can unlock the transformative power of AI and science to drive sustainable economic growth and development.

RECOMMENDATIONS

For Policymakers, they should:

- Create policies and regulations that support AI adoption and development in Abia State.
- Invest in digital infrastructure such as high speed internet and data storage facilities and AI development.
- Provide funding and incentives for AI research and development as well as for entrepreneurs who adopt AI in their businesses.

For Entrepreneurs they should:

- Invest in developing research skills and knowledge to stay competitive in the market.
- Adopt AI solutions that can improve efficiency, productivity and innovation in their business.
- Collaborate with academic institutions to access AI expertise and resources.

For Academic institutions, they should:

- Develop programs and courses that teach AI skills and knowledge.
- Collaborate with industry partners to provide practical AI training and research opportunities.
- Conduct research on AI applications and implications in various industries.

For Private Sector they should:

- Invest in AI, research and development to drive innovation and competitiveness.
- Support AI adoption in businesses and industries through funding, expertise and resources.
- Develop AI solutions that can address specific industry challenges and needs.

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