

Full Length Paper

Role of Artificial Intelligence in the Survival of Nigerian Start-Up Businesses

¹Okoro I., and ²Chukwudebelu, I.V. (Phd.,

¹Department of Religions Studies, Paul University Awka
Prnce.ihendu@yahoo.com +2348064195833

²**Department** Department Of Management And Entrepreneurial Studies
Paul University Awka
izuchukwudebelu@yahoo.com
+2348064195833

Abstract

The study investigated the role of AI in the survival of start-up businesses in Nigeria. Specifically, the study examined the relationship between AI and the survival of start-up businesses. It also examined the effect of AI on improved service or product delivery by start-up businesses, as well as the influence of AI on informed business decisions. A descriptive survey design was adopted. A questionnaire was used to collect data from 60 respondents. Descriptive statistics frequency, percentages, mean and standard deviation for research questions and chi-square were used to analyse the data. Findings revealed that AI has a significant positive influence on the survival of start-up businesses in Nigeria, the adoption of AI will significantly improve service or product delivery by start-up businesses, and AI will significantly influence and support informed business decisions. Based on the findings, the study recommends that start-up businesses should prioritise innovation in the application of AI, moving beyond traditional uses to explore how AI can solve complex societal challenges. It also suggests that there should be increased collaboration amongst start-up businesses to reduce the burden of the initial cost of AI, which can be a barrier to competitive advantage. Additionally, investment in AI literacy and skills development should not be compromised in order for start-ups to maximise its benefits. There should be a need to create easy access for start-up funding, including venture capital, considering the substantial resource requirements for effective AI integration.

Keywords: Artificial Intelligence, Start-up Businesses, Innovation, Service or Product Delivery, Business Decision

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INTRODUCTION

Artificial intelligence technology is transforming Nigerian entrepreneurship by enhancing innovation and productivity while creating new markets. AI systems perform repetitive tasks such as customer service through chatbots and complete accounting and supply chain management tasks (Dhand et al., 2025). Through automation, start-ups have been able to optimise their resources and achieve cost savings, which allows

business growth (Kacar, 2023). Small and modestly budgeted MSMEs have been particularly impacted by this trend. With current advancements in technology and its application, it is incontrovertible that AI technology remains critical for any start-up survival. This is especially evident considering the effect of the COVID-19 crisis and its aftermath on businesses and humanity.

In addition, AI is allowing the creation of new products

localised on a smaller scale (Septiyandini et al., 2024). For example, health-tech start-ups use AI to create diagnostic tools for Nigerian-endemic diseases (Grashof & Kopka, 2023), and agritech companies use AI to optimise crop production and minimise post-harvest losses. Fintech start-ups are using AI to facilitate financial inclusion by offering credit scoring, fraud detection and tailored financial guidance for the underserved populations (Adelaja et al., 2024). This also creates a more inclusive entrepreneurship space in which otherwise under-represented people have a stake. AI-based entrepreneurship is also addressing social issues. Education start-ups are using AI to develop individualised learning environments to eliminate disparities in educational quality in rural and urban locations (Goswami & Sharma, 2024).

However, as the AI era offers immense potential to Nigerian start-ups, it is also advisable to tread carefully with its inevitable obstacles. Onyemere et al. (2024) pointed out that inadequate digital infrastructure and unreliable internet access throughout Nigeria prevent start-ups from fully utilising AI technology. Start-ups aiming to utilise these technologies encounter considerable obstacles related to job losses, data security, and AI ethics (Wolniak & Stecula, 2024). Start-ups in Nigeria struggle to adopt AI because of high implementation costs and a shortage of qualified professionals in this field (Attah et al., 2024).

AI technology will no doubt transform and greatly improve the way start-up business activities are carried out, which include automation, operational efficiency, market research, customer experience, risk management, and fraud prevention. The main future challenge pertains to utilising the advantages of AI technologies while minimising the disadvantages in terms of job losses and greater wealth inequalities (Makridakis, 2017).

It has become obvious that digital technologies, including AI, have a significant influence on start-up business innovation, which includes acting as facilitators, mediators, or enablers or being the end result of business operations or the definition of the overall business model (Elia et al., 2020).

Von Briel et al. (2018) stated how digital technologies are enablers for businesses, defining them according to two characteristics, namely specificity and relationality. Digital technologies activities empower them to mediate and have control over inputs, outputs, and related transformations. They can decide the input resources and the ones that can be regarded as outputs. They further posited that “at one extreme there are digital technologies with a high degree of specificity that deterministically transform a predefined set of specific inputs into specific outputs. At the other extreme are digital technologies with a low degree of specificity that accept a multitude of poorly defined or indeterminate inputs and let other actors decide how the inputs are transformed and delivered as outputs.”

Relationality, on the other hand, is about the structural connections of technologies, and they are interconnected. Their interconnectedness brings out channels through which resources flow. Relationality influences the size and quality of the network, and this, in turn, defines the limits of business processes. There are technologies that are highly relational, while some at the opposite extreme interact with only one other actor. Thus, digital technologies can be regarded as external enablers of business creation.

Artificial Intelligence

Artificial intelligence, popularly known as AI, refers to the mimicking of human intelligence in machines that are configured to think and learn like humans, such as machine learning, robotics, etc. 'AI' refers to a software system meant to accomplish activities that need human intellect (Huang & Rust, 2018). According to the Organisation for Economic Co-operation and Development (OECD) in 2024, AI is “a machine-based system that, for explicit or implicit objectives, infers from the input it receives how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments.”

AI software is being used by businesses on a daily basis to optimise internal operations, cut costs, speed up turnaround times, and enhance production (Daugherty & Wilson, 2018). Teams who are already promoting and adopting AI software have a clear edge over others in terms of competition, market visibility and being able to take advantage of the next revolution in technology, which is developing at a rate that has not been seen before (Ernest & Florence, 2024).

Consequently, the positive impacts of AI on business start-ups include enhanced customer satisfaction, provision of quality product or service delivery, and efficient productivity and economic performance. It is important to state that start-ups will remain most relevant and competitive in the current business environment by embracing AI technologies, either wholly or partially.

As young companies, for start-ups to be successful and sustainable in the contemporary business world, they must be products of innovation and creativity, which should be adapted to the transformational force of AI. Hence, the adoption of AI by start-ups will mark a transformative period where value creation through innovation is not just an aspiration but a convincing reality.

Start-up Business Creation Process in the Digital Age

The creation of a business is the process that roughly begins with a business idea and culminates when the products or services based on it are sold to customers/clients in the market space (Francesco, Annamaria, & Pietronudo, 2022). It is mostly probable that businesses will be created at a point when an opportunity

is recognised (Gartner, 1985). The recognition can be inspired from within or outside; "the sequences of opportunity recognition, stimulated both internally and externally, culminate in the identification of the business concept." Nour-Mohammad et al. (2012), as cited in Francesco et al., identified the following steps as the process of business creation: recognising and seizing opportunities, transforming these opportunities into marketable goods or services, adding value through time and resources, as well as taking the necessary risks, and realising the reward.

More recently, Bakker and Shepherd (2017) categorised all the stages into three key phases of exploration, development, and exploitation. All these conceptualisations obviously have some elements in common, despite the focus on phases. The justification is that the creation of a business occurs through opportunity identification, which is followed by the construction of the business model (BM) and the definition of the organisational structure. In any case, the last phase involves all the activities necessary to launch the enterprise in the market.

Benefits of Artificial Intelligence Application in Start-up Businesses

AI serves as a veritable tool for start-up businesses to improve their operations and processes (Atiku, 2023). The following areas provide a deeper understanding of how the start-ups can benefit from AI integration.

a) AI can remove the burden of repetitive work on employees. Thus, activities that are not only unsatisfactory but also do not provide opportunities for professional development or the learning of novel skills can also be eliminated. For instance, the vast majority of customer frequently asked questions relate to the same thing/concern. Hence, many companies have decided to automate the process to respond to the queries without delay. This is evidenced by automated chatbots, while employees can focus on more strategic and critical tasks which encourage innovation (Mazumder, 2024).

b) Business performance can better improve with the use of AI, particularly in marketing through the creation of more relevant and engaging content, broader customer coverage and a better market analysis. This can enhance proper understanding of customer preferences, market trends, and how to use their resources wisely as well as redefine marketing strategies (Anane-Simon & Atiku, 2023).

c) AI could be used to improve the entrepreneurs' communication and business ideas and enable individuals to attract more funds (entrepreneurial finance) for growth. Effective communication by the entrepreneurs on their potentials and the projects can go a long way in attracting willing investors (Clark, 2008; Mason and Harrison, 2003). In line with the foregoing, several

attempts have been made to use AI to organise entrepreneurs' communicative behaviours and analyse the presentations of start-ups, especially in relation to crowdfunding projects. For instance, with the use of psychological theories, such as the impression management theory by Goffman (1959), it was established that self-presentation and illustration techniques are positively connected with crowdfunding success (Korzynski et al., 2021).

d) AI has the potential to affect the core of entrepreneurship. As Townsend and Hunt (2019) pointed out, entrepreneurship theories are built around the fundamental question of how entrepreneurs deal with uncertainty. Entrepreneurs operate in environments where future possible states of the world and consequences of actions and their probabilities are unknown (Knight, 1921). For example, there is uncertainty about market demand for novel products and services, social resistance to innovation, and responses of competitors; at the same time, entrepreneurs are constrained by limited resources. The key capability of AI is prediction, which has the potential to reduce uncertainty (Lupp, 2023; Agrawal et al., 2024). AI can be used to search through a very large set of options to identify opportunities, for example, in product design or the choice of market segments. To buttress it, Townsend and Hunt (2019) gave examples which included the use of AI in drug discovery (the startup Insilico Medicine) and AI-powered design tools (Autodesk or the startup Stitch Fix).

e) AI possesses analytical capabilities that can give businesses more competitive advantages. For instance, its big data analytical potentials create opportunities for improved projections of company performances and results, more reliable insights into emerging consumer trends, and the development of effective cost management methods. It also plays a critical role in allowing entrepreneurs to make data-driven decisions.

Negative Effects of AI on Start-up Businesses

On the other hand, AI integration does not come without some disadvantages to the start-up businesses, which are discussed below.

a) **Over Reliance on External Provider:** Most AI systems are available as cloud-based services or depend on outside providers for continuous upgrades, support, and upkeep. Start-ups are at risk of experiencing service outages due to poor networks, vendor lock-in, and changes in terms of service or price.

b) **Data Privacy and Security Concern:** Based on the huge data AI uses, privacy, security, and ethical use are major concerns on how to avoid or secure sensitive data from illegal access, breaches, and misuse. This requires the establishment of strong cybersecurity safeguards and maintenance of compliance with data protection legis-

lation, which can be very expensive.

c) Complexity and Technical Expertise: Specialised technical knowledge in domains like software engineering, data science, and machine learning is necessary for creating and implementing AI-driven systems. Navigating the complexities of AI deployment can be intimidating for start-ups without the necessary expertise or access to experienced workers, which can cause delays and setbacks.

d) Limited Understanding and Trust: The perception of AI technologies as mysterious or opaque can result in a lack of confidence and understanding among various stakeholders, including investors, customers, and regulators.

e) Limited Creativity and Human Touch: While AI is great at automation and data analysis, it can fall short when it comes to certain elements of business, including new idea generation and clients' relationship management.

Theoretical Perspective

There are some theories that explain the role of AI in Nigerian start-up businesses. They include Innovation Diffusion Theory and Creative Destruction Theory.

Innovation Diffusion Theory: This theory was developed in 1962 by E.M. Rogers, a communication theorist at the University of New Mexico. It explains how a new idea can move through stages of adoption by different people who use the new idea. In other words, it outlines how new ideas, practices, technological and

other advancements spread throughout societies and cultures, from introduction to widespread adoption over long periods of time.

Consequently, AI, as a disruptive technology, may follow the innovation diffusion curve, with early adopters gaining a competitive advantage in business.

METHODOLOGY

The research design employed in this study was descriptive and analytical in nature. In determining the sample size from the population of the study, the researcher used the simple random sampling method in order to ensure adequate representation of the population, reduce bias and increase the generalisability of the results. A reliability test was done with Cronbach's Alpha method to determine the internal consistency of the questionnaire. The acceptable reliability result will be 0.60 and above.

Data collected from the survey were analysed using frequency, percentages, mean and standard deviation to answer the research questions, while chi-square was used to test the hypotheses at the 0.05 level of significance. A total of 63 copies of questionnaires were distributed, while 60 respondents answered and returned their copies. This represents approximately a 95% level of response. In testing the hypothesis, critical values are being set at a 95% confidence level or 5% degree of freedom, i.e., $DF = (r-1)(c-1)$, where r = row and c = column, $(2-1)(4-1) = 3$.

RESULTS AND DISCUSSION

Table1: Demographic Characteristics of Respondents

Age (Years)	Frequency	Percent
19 -18	6	10.0
26 - 30	24	40.0
31 - 40	12	20.0
Above 41	18	30.0
Total	60	100.0
Gender		
Male	42	70.0
Female	18	30.0
Total	60	100.0
Marital Status		
Single	12	20.0
Married	48	80.0
Total	60	100.0
Educational Qualification		
Diploma/BSc	35	58.0
Masters	20	33.0
PhD	2	3.0
Others	3	5.0
Total	60	100.0

Table 1 shows that 70% of the respondents were male, while 30% were female, indicating that more males than females are engaged in entrepreneurship in Nigeria. It also reveals that adults 26 years and above are those who dominate the entrepreneurial activities. The table further reveals that 20% of the total respondents were singles, while 80% were married, which signifies that most

entrepreneurs are married. In terms of educational qualification, it shows that 58% of the respondents have either a diploma or a BSc, while 33% and 3% have a master's and a PhD, respectively. This signifies that the majority of those in entrepreneurial activities have obtained a formal education.

Table 2: Relationship between AI and the survival of start-up businesses

S/N	Statements	Agree	Disagree	Mean	SD	Remarks
1	AI Technology can enhance the survival of business ventures	100%	0%	3.40	0.49	Agree
2	Adoption of AI can give a company competitive advantage in the market place	90%	10%	3.40	0.66	Agree
3	Sales and revenue can significantly increase with the support AI.	95%	5%	3.70	0.56	Agree
4	Businesses that utilize AI are more resilient during economic downturns	95%	5%	3.45	0.59	Agree
		95%	5%	3.49	0.59	

Table 2 shows that 95% of the respondents, with a mean score of 3.49, agreed that AI is a strong tool in withstanding competition, increasing sales and revenue,

and navigating economic downturn. Hence, there is a significant positive relationship between AI and the survival of start-up businesses

Table 3: Effect of AI on improved service or product delivery by start-up businesses

S/N	Statements	Agree	Disagree	Mean	SD	Remarks
1	AI technology will improve quality of service and product delivery	90%	10%	3.50	0.67	Agree
2	Improved customer satisfaction can be experienced through the use AI in business.	85%	15%	3.20	0.93	Agree
3	AI can improve product/service innovation in start-ups and other business ventures.	95%	5%	3.65	0.57	Agree
4	Performance and work-life balance can be improved with the adoption of AI technology.	85%	15%	3.10	0.77	Agree
5	Businesses driven by AI can experience faster delivery times.	90%	10%	3.35	0.65	Agree
		89%	11%	3.36	0.72	

Table 3 indicates that 89% of the respondents, with a mean score of 3.49, agreed that AI technology can improve customer satisfaction, product/service innovation

and work-life balance and encourage faster delivery. Consequently, AI has a positive effect on the quality of product/service delivery.

Table 4: Influence of AI on informed business decision

S/N	Statements	Agree	Disagree	Mean	SD	Remarks
1	AI Technology contributes to improved business decision making	95%	5%	3.10	0.89	Agree
2	There will be reduction in errors in AI-driven business transactions.	90%	10%	3.40	0.66	Agree
3	AI adoption would enhance data analysis and market projections	95%	5%	3.45	0.59	Agree
4	Business investments decisions can be enhanced with the integration of AI technology.	90%	10%	3.25	0.62	Agree
		91%	09%	3.30	0.69	

Table 4 shows a mean score of 3.30, and 91% of the respondents agreed that AI technology can reduce errors in business transactions and enhance data analysis and

investment decisions. Therefore, AI has a positive significant influence on informed business decisions.

There is no significant relationship between AI and the survival of start-up businesses.

Table 5: Relationship between AI and the survival of start-up businesses

Variables Response Categories	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
AI enhances survival of business ventures	24 (40.0%)	36 (60.0%)	0 (0.0%)	0 (0.0%)	60 (100%)
AI adoption gives competitive advantage	30 (50.0%)	24 (40.0%)	6 (10.0%)	0 (0.0%)	60 (100%)
Total N (% o.t.)	54 (45.0%)	60 (50.0%)	6 (10.0%)	0 (0.0%)	120 (100%)
X², (p-value)					X²=9.06, and p < 0.05

Data in table 5 show that the $X^2c = \sum(O_i - E_i)^2 / E_i = 9.06$ while $X^2_{t0.05,3} = 7.82$. Since $X^2c = 9.06 > X^2t = 7.82$, the null hypothesis which stated, "There is no significant relationship between AI

and the survival of start-up businesses" was rejected. As a result, there is significant positive relationship between AI and the survival of start-up businesses.

The adoption of AI has not significantly improved service or product delivery by start-up businesses.

Table 6: Adoption of AI on improved service or product delivery by start-up businesses

Variables Response Categories	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
AI improves quality of service and product delivery	36 (60.0%)	18 (30.0%)	6 (10.0%)	0 (0.0%)	60 (100%)
AI Improves customer satisfaction	27 (45.0%)	24 (40.0%)	3 (5.0%)	6 (10.0%)	60 (100%)
Total N (% o.t.)	63 (52.5%)	42 (35.0%)	9 (7.5%)	6 (5.0%)	120 (100%)
X², (p-value)					X²=9.14, and p < 0.05

Table 6 shows that the $X^2c = \sum(O_i - E_i)^2/E_i = 9.14$ while $X^2_{t0.05,3} = 7.82$.

Since $X^2c = 9.14 > X^2t = 7.82$, we reject the null hypothesis (H_0) which stated, "The adoption of AI has not

significantly improved service or product delivery by start-up businesses". Therefore, this suggests that adoption of AI has significantly improved service or product delivery by start-up businesses.

Informed business decisions are not significantly influenced by AI.

Table 7: Influence of AI on informed business decisions

Variables Response Categories	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
AI improves business decision making	21 (35.0%)	30 (50.0%)	3 (5.0%)	6 (10.0%)	60 (100%)
AI reduces errors in business transactions	30 (50.0%)	24 (40.0%)	6 (10.0%)	0 (0.0%)	60 (100%)
Total N (% o.t.)	51 (42.5%)	54 (45.0%)	9 (7.5%)	6 (5.0%)	120 (100%)
X², (p-value)					X²=9.25, and p < 0.05

Table 7 shows that the $X^2c = \sum(O_i - E_i)^2/E_i = 9.25$ while $X^2_{t0.05,3} = 7.82$.

Since $X^2c = 9.25 > X^2t = 7.82$, we reject the null hypothesis (H_0) which stated, "Informed business decisions are not significantly influenced by AI". Hence, it shows that informed business decisions are significantly influenced by AI.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study examined the role of AI in the survival of start-up businesses in Nigeria. The findings are summarised as follows:

AI has a significant positive influence on the survival of start-up businesses in Nigeria. The adoption of AI will significantly improve service or product delivery by start-up businesses. AI will significantly influence and support informed business decisions.

Furthermore, AI is a strategic enabler, and its adoption by start-ups significantly enhances competitive positioning, operational efficiency, and decision-making processes. AI technologies such as machine learning algorithms and natural language processing tools enable start-ups to process large datasets, identify market trends, and make informed decisions rapidly, reducing risks and seizing market opportunities.

AI has a profound transformative impact on start-ups by fostering innovation, enhancing productivity, and facilitating the management of complex business operations. The integration of AI not only helps in developing new business models but also in redefining existing ones, making them more agile and adaptable to changing market conditions.

Its influence spans across various sectors, including healthcare, finance, manufacturing, and services, where

it plays a critical role in driving innovation and operational efficiencies. AI's capabilities in data analytics and automation provide start-ups the tools to overcome traditional barriers to entry and scale at an accelerated pace.

Recommendations

In light of the findings and conclusions, the following recommendations are made by the researcher:

1. Start-up Businesses should prioritise innovation in the application of AI, moving beyond traditional uses to explore how AI can solve complex societal challenges. This includes healthcare diagnostics, environmental monitoring, security improvement and enhancing public services through smarter infrastructure.
2. There should be increased collaboration amongst start-up businesses to reduce the burden of the initial cost of AI, which can be a barrier to competitive advantage.
3. Investment in AI literacy and skills development should not be compromised in order for start-ups to maximise its benefits. This involves not only hiring AI specialists but also providing ongoing education and training to existing staff to ensure they are capable of leveraging AI tools effectively.
4. There should be a need to create easy access for start-up funding, including venture capital, considering the substantial resource requirements for effective AI integration. This involves not only securing financial resources but also ensuring access to mentorship and the AI Development Centre to obtain strategic advice from experienced investors in the AI space.

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