



## EXPLORING THE IMPACT OF AI INTEGRATION IN BUSINESS INCUBATORS AND ACCELERATORS ON ENTREPRENEURSHIP EDUCATION AND STARTUP SUCCESS

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### Abstract

This study investigated the impact of artificial intelligence (AI) integration in business incubators and accelerators on entrepreneurship education and startup success. The study aims to assess the effectiveness of AI-driven support systems, examine the influence of AI on startup selection and evaluation, explore the impact of AI technologies on startup growth and sustainability, and investigate the ethical and social implications of AI adoption in entrepreneurship education. A descriptive survey design was adopted for the study. Three research questions were raised to guide the study. The population of the study was all undergraduates of Business Education in tertiary institutions in Bayelsa State. A sample of 240 respondents drawn from the Department of Business Education in the 3 tertiary institutions was used for the study. The instrument for data collection was a structured questionnaire styled as an "AI-Driven Support System Questionnaire" developed by the researcher and validated by experts. The reliability analysis was done using Cronbach Alpha Formula, which yielded a value of 0.89. The research questions were answered using mean and standard deviation. The findings revealed that integrating AI technologies into entrepreneurship education programs within business incubators and accelerators can foster innovation, promoting equitable access to entrepreneurial opportunities, and driving economic growth.

**Keywords:** Artificial Intelligence (AI), Integration, Business Incubators, Accelerators, Entrepreneurship Education, Startup Success

### Introduction

Artificial intelligence (AI) has emerged as a transformative force reshaping various aspects of business and society, including entrepreneurship education and startup ecosystems. As the global economy becomes increasingly digitized and interconnected, the integration of AI technologies in business incubators and accelerators holds the potential to revolutionize entrepreneurship education and drive startup success (Sussan & Acs, 2017). Business incubators and accelerators play a vital role in supporting aspiring entrepreneurs by providing mentorship, resources, and networking opportunities to help them navigate the challenges of launching and scaling their ventures (Colombo et al., 2015).

The rapid advancements in AI technologies, such as machine learning, natural language processing, and predictive analytics, offer unprecedented opportunities to enhance the effectiveness and efficiency of support systems within business incubators and accelerators (Bartel, 2019). AI-driven mentorship programs can provide personalized guidance and feedback to entrepreneurs based on their unique needs and preferences, facilitating skill development and knowledge acquisition (Vader et al., 2020). Moreover, AI algorithms can analyze vast amounts of



data to identify promising startup opportunities, assess market viability, and optimize investment decisions (Nambisan et al., 2019).

Despite the potential benefits of AI integration in business incubators and accelerators, there are also significant ethical and social implications that warrant careful consideration (Brynjolfsson & McAfee, 2017). Issues such as algorithmic bias, data privacy, and transparency raise concerns about the equitable distribution of AI-driven resources and opportunities among aspiring entrepreneurs, particularly those from underrepresented and marginalized communities (Lau et al., 2020). Additionally, the reliance on AI technologies in decision-making processes may exacerbate existing disparities and reinforce systemic inequalities within startup ecosystems (Mittelstadt et al., 2016).

As the adoption of AI technologies continues to accelerate, it is essential to examine their impact on entrepreneurship education and startup success comprehensively. This research aims to explore the multifaceted implications of AI integration in business incubators and accelerators, including its effect on support systems for aspiring entrepreneurs, startup selection and evaluation processes, and long-term outcomes for startup ventures (Zhang et al., 2019). By conducting a thorough investigation into these issues, we can gain insights into how AI can be leveraged effectively to foster innovation, promote diversity and inclusion, and drive economic growth in the entrepreneurial ecosystem.

Through a combination of qualitative and quantitative research methods, including surveys, interviews, and case studies, this study seeks to provide actionable recommendations for educators, policymakers, and industry stakeholders on best practices for integrating AI technologies into entrepreneurship education programs within business incubators and accelerators (Carayannis et al., 2018). By addressing the ethical challenges and maximizing the potential benefits of AI integration, the study can create a more inclusive and equitable entrepreneurial ecosystem that empowers individuals from diverse backgrounds to pursue their entrepreneurial aspirations and contribute to social and economic development.

### **Statement of the Problem**

The integration of artificial intelligence (AI) in business incubators and accelerators presents both opportunities and challenges for entrepreneurship education and startup success. While AI technologies hold the potential to enhance support systems, streamline decision-making processes, and drive innovation within these ecosystems, there is limited understanding of their impact on entrepreneurship education and startup outcomes. Despite the growing interest in AI integration, there is a gap in the literature regarding the specific implications of AI adoption for entrepreneurship education and the long-term success of startup ventures (Bartel, 2019; Nambisan, 2019).

One of the key challenges is the lack of empirical research examining the effectiveness of AI-driven support systems within business incubators and accelerators. While there is anecdotal evidence suggesting that AI technologies can improve mentorship, networking, and resource allocation for aspiring entrepreneurs, there is a need for rigorous empirical studies to evaluate their impact on entrepreneurship education and startup success (Vader, 2020). Additionally, the ethical and social implications of AI adoption in these contexts remain understudied, raising concerns about algorithmic bias, data privacy, and transparency in decision-making processes (Lau, 2020; Mittelstadt, 2016).

Furthermore, the rapid pace of technological advancement and the complex interplay between AI and entrepreneurship present unique challenges for educators, policymakers, and industry stakeholders. Without a comprehensive understanding of the implications of AI integration in business incubators and accelerators, there is a risk of exacerbating existing disparities and



reinforcing systemic inequalities within startup ecosystems (Brynjolfsson & McAfee, 2017; Zhang, 2019). Therefore, there is an urgent need for research that explores the multifaceted impact of AI integration on entrepreneurship education and startup success, addressing both its potential benefits and unintended consequences.

### **Research Questions**

The following research questions guided the study

- i. What is the impact of AI on entrepreneurship startup selection and evaluation?
- ii. How do AI technologies impact entrepreneurship startup growth and sustainability?
- iii. What are the ethical and social implications of AI adoption in entrepreneurship education?

### **Conceptual Review**

Artificial intelligence (AI) integration in the context of business incubators and accelerators refers to the incorporation of AI technologies and algorithms into the operations, support systems, and decision-making processes of these entrepreneurial ecosystems. AI integration encompasses various applications, including but not limited to data analytics, machine learning, natural language processing, and predictive modeling, aimed at enhancing the effectiveness, efficiency, and scalability of business support services (Bartel, 2019). AI technologies enable business incubators and accelerators to analyze large volumes of data, identify patterns and trends, and make data-driven decisions to support aspiring entrepreneurs and startup ventures (Nambisan, 2019). Business incubators and accelerators play a critical role in nurturing entrepreneurial talent, fostering innovation, and accelerating the growth of early-stage ventures. Incubators typically provide workspace, mentorship, networking opportunities, and access to funding to help startups develop and validate their business ideas, whereas accelerators offer more intensive programs focused on rapid growth and scaling strategies (Colombo, 2015). By integrating AI technologies into their support systems, business incubators and accelerators aim to optimize resource allocation, facilitate strategic decision-making, and improve the overall success rate of startup ventures (Vader, 2020).

Entrepreneurship education refers to the formal and informal learning experiences designed to equip individuals with the knowledge, skills, and mindset necessary to start and manage successful businesses. Entrepreneurship education programs encompass a wide range of activities, including classroom instruction, experiential learning, mentorship, and networking events, aimed at fostering entrepreneurial competencies and fostering an entrepreneurial mindset (Carayannis, 2018). With the integration of AI technologies, entrepreneurship education programs can leverage data-driven insights, personalized learning experiences, and interactive technologies to enhance student engagement, facilitate skill development, and prepare aspiring entrepreneurs for the challenges of launching and scaling startup ventures.

Startup success refers to the achievement of key milestones, such as product-market fit, revenue growth, customer acquisition, and sustainable profitability, by early-stage ventures. While success metrics may vary depending on the industry, market, and business model, successful startups typically demonstrate innovation, resilience, and scalability (Sussan & Acs, 2017). The integration of AI technologies in business incubators and accelerators is expected to have a significant impact on startup success by providing entrepreneurs with access to advanced analytics, market insights, and strategic guidance to navigate competitive landscapes, capitalize on emerging opportunities, and overcome common challenges encountered during the startup journey.

AI integration in business incubators and accelerators has the potential to transform entrepreneurship education and drive startup success by leveraging data-driven insights,



optimizing support systems, and facilitating strategic decision-making. By harnessing the power of AI technologies, business incubators, and accelerators can enhance their ability to identify and nurture high-potential startup ventures, support aspiring entrepreneurs, and contribute to the growth and sustainability of the entrepreneurial ecosystem.

### **Theoretical Review**

#### **1. Resource-Based Theory (RBT)**

Resource-based theory, proposed by Barney (1991), suggests that the competitive advantage of firms stems from the unique resources and capabilities they possess. In the context of AI integration in business incubators and accelerators, RBT can help explain how the adoption of AI technologies enhances the resource base of these organizations, enabling them to offer more valuable support services to startups. AI technologies, such as data analytics tools and machine learning algorithms, represent valuable resources that can be leveraged to analyze market trends, identify high-potential startup opportunities, and provide personalized guidance to entrepreneurs. By integrating AI technologies into their resource base, business incubators and accelerators can gain a competitive edge in attracting and supporting promising startups, ultimately contributing to their success (Barney, 1991).

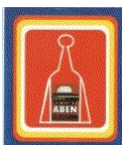
#### **2. Social Learning Theory**

Social Learning Theory, developed by Bandura (1977), emphasizes the importance of observational learning, modeling, and social reinforcement in shaping individual behavior. In the context of entrepreneurship education and startup success, Social Learning Theory can help explain how AI integration influences the learning experiences and behaviors of aspiring entrepreneurs. Through AI-driven mentorship programs, personalized learning platforms, and interactive educational technologies, entrepreneurship education programs can provide students with opportunities to observe and learn from successful entrepreneurs, industry experts, and AI-driven decision-making processes. By modeling entrepreneurial behaviors, encouraging experimentation, and providing feedback and reinforcement, AI-enhanced entrepreneurship education programs can foster the development of entrepreneurial competencies and mindset among students, ultimately enhancing their ability to succeed in launching and scaling startup ventures (Bandura, 1977).

### **Empirical Review**

Charles-Owaba (2024) examined the ethical dimensions surrounding the use of AI-generated content in mathematics education through a systematic Literature Review. It explores key ethical concerns, including bias, fairness, transparency, privacy, and intellectual property rights, and discusses theoretical frameworks that inform ethical decision-making in educational contexts. Drawing on Ethical Decision-Making Theory, Critical Theory, and Social Learning Theory, this highlights the importance of navigating ethical dilemmas responsibly to ensure equitable access, promote inclusive practices, and foster ethical AI integration in mathematics education. The study identified common themes and trends in ethical consideration in AI-generated content in Mathematics Education. Through critical reflection, collaboration, and informed decision-making, educators, developers, and policymakers can work toward creating learning environments that prioritize the well-being and rights of students while harnessing the transformative potential of AI technologies in mathematics education.

Bartel (2019) examined existing literature on the impact of AI technologies on support systems within business incubators and accelerators. It analyzes empirical studies to assess how AI-driven mentorship programs, data analytics tools, and decision-making algorithms enhance the effectiveness and efficiency of support services for aspiring entrepreneurs.



Nambisan (2019) examined the role of AI algorithms in identifying and evaluating startup opportunities within business incubators and accelerators. It examines studies that investigate how AI-driven predictive modeling techniques inform investment decisions, assess market viability, and optimize the selection of high-potential startup ventures for support.

### Methodology

This study adopted a descriptive survey design. Charles-Owaba (2022) defined descriptive survey research design as the one in which a group of people or item is studied by collecting analyzing data from only a few individuals or items considered to be representatives of the entire group. This design is appropriate for this study since information will be gathered from a sample of the population who are familiar with the ideas relating to the purpose of the study with the aim of generalizing the results for the entire population. The area of the study is Bayelsa State. The population of the study was all undergraduates of Business Education in tertiary institutions in Bayelsa State. A sample of 240 respondents drawn from the Department of Business Education in the 3 tertiary institutions was used for the study. The instrument for data collection was a structured questionnaire structured as “AI-Driven Support System Questionnaire” formatted in four–point rating scale. It consists of two (2) parts, namely; part I and II. Part I measured the demographic variables of the respondents, while part II is further divided into: Section A, B and C which measured the variables in research question 1, 2 and 3. The instrument was validated by specialist of Tests and Measurement and Vocational and Technical Education. Their corrections and suggestions resulted to the final draft used in the study. The instrument was trial tested using ten (10) other VOCTECH Experts that did not participate in the study but possess the same characteristics of the population of interest. The reliability of the instrument was established using Cronbach Alpha Formula. A calculated reliability coefficient of .79 was achieved and was considered appropriate. The researcher administered the instruments to the respondents by direct contact and a 100% return rate was achieved. Mean and Standard deviation were used to analyzed the research question. Items with mean value of 2.50 and above were agree, while those with mean value below 2.50 were termed to be disagree.

### Analysis and Results

#### Research Question 1

What is the impact of AI on entrepreneurship startup selection and evaluation?

**Table 1: Mean and standard deviation on the impact of AI on entrepreneurship startup selection and evaluation**

| S/N               | STATEMENT                                                                                                                           | X            | SD     | REMARK   |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|----------|
| 1.                | AI-driven algorithms helps in identifying high-potential startup opportunities.                                                     | 2.8822       | .85152 | A        |
| 2.                | AI technologies improve the efficiency of startup selection processes within business incubators and accelerators                   | 2.9493       | .74699 | A        |
| 3.                | AI integration enhances the objectivity and fairness of startup evaluation processes.                                               | 2.7452       | .50083 | A        |
| 4.                | The outcomes of startup ventures selected through AI-driven processes within business incubators and accelerators are satisfactory. | 2.7315       | .53884 | A        |
| 5.                | The transparency of AI-driven decision-making processes in startup selection and evaluation is effective.                           | 2.9096       | .48043 | A*       |
| <b>GRAND MEAN</b> |                                                                                                                                     | <b>2.888</b> |        | <b>A</b> |

Source: Fieldwork (2024) \*A=Agree, D=Disagree



The table 1 above shows the mean and standard deviation on the responses on impact of AI on entrepreneurship startup selection and evaluation. All items had mean value above the cut-off value of 2.50, which implies that all respondents agree that the AI-driven algorithms helps in identifying high-potential startup opportunities, improve the efficiency of startup selection processes within business incubators and accelerators, enhances the objectivity and fairness of startup evaluation processes, and presents transparency in decision-making processes in startup selection and evaluation.

### Research Question 2

How do AI technologies impact entrepreneurship startup growth and sustainability?

**Table 2: Mean and standard deviation on the AI technologies impact entrepreneurship startup growth and sustainability**

| S/N               | STATEMENT                                                                                                  | X           | SD      | REMARK   |
|-------------------|------------------------------------------------------------------------------------------------------------|-------------|---------|----------|
| 6                 | AI-driven strategies contribute to the growth of startup ventures.                                         | 2.6288      | .38853  | A        |
| 7                 | AI-driven customer engagement strategies contribute to the retention and loyalty of customers effectively. | 2.6137      | .89769  | A        |
| 8                 | AI technologies improve the adaptability and agility of startup ventures in responding to market changes.  | 2.849       | 1.52666 | A        |
| 9                 | AI integration is contributing to the long-term sustainability of startup ventures.                        | 2.7301      | .35806  | A        |
| 10                | AI technologies to optimize operational processes and improve efficiency in startup ventures.              | 2.901       | .30861  | A        |
| <b>GRAND MEAN</b> |                                                                                                            | <b>2.57</b> |         | <b>A</b> |

Source: Fieldwork (2024) \*A=Agree, D=Disagree

The table 2 above shows the mean and standard deviation on the responses on AI technologies impact entrepreneurship startup growth and sustainability. All items had mean value above the cut-off value of 2.50, which implies AI-driven strategies contribute to growth startup ventures, retention and loyalty of customers, improves adaptability and agility of startup ventures and optimizes operational processes and efficiency of ventures.

### Research Question 3

What are the ethical and social implications of AI adoption in entrepreneurship education?

**Table 3: Mean and standard deviation on the ethical and social implications of AI adoption in entrepreneurship education**

| S/N | STATEMENT                                                                                                                            | X    | SD      | REMARK |
|-----|--------------------------------------------------------------------------------------------------------------------------------------|------|---------|--------|
| 11  | AI integration in entrepreneurship education programs may impact student privacy and data security.                                  | 2.78 | 1.60764 | A      |
| 12  | The fairness and objectivity of AI-driven evaluation and assessment methods used in entrepreneurship education are not satisfactory. | 2.70 | .56096  | A      |



|                   |                                                                                                                         |             |        |          |
|-------------------|-------------------------------------------------------------------------------------------------------------------------|-------------|--------|----------|
| 13                | AI integration in entrepreneurship education may exacerbate existing inequalities and disparities among students.       | 2.51        | .64861 | <b>A</b> |
| 14                | The potential bias and discrimination embedded in AI algorithms used in entrepreneurship education is not satisfactory. | 2.07        | .35817 | <b>D</b> |
| 15                | AI technologies in entrepreneurship education programs influence student autonomy and decision-making.                  | 2.37        | .30496 | <b>D</b> |
| <b>GRAND MEAN</b> |                                                                                                                         | <b>2.48</b> |        | <b>D</b> |

Source: Fieldwork (2024) \*A=Agree, D=Disagree

The table 3 above shows the mean and standard deviation on the responses on ethical and social implications of AI adoption in entrepreneurship education. All items had mean value below the cut-off value of 2.50, which implies the ethical and social implications AI adoption in entrepreneurship education are student privacy and data security, exacerbate existing inequalities and disparities among students, enhance potential bias and discrimination and influence student autonomy and decision-making.

### **Discussion of the Findings**

#### **The impact of AI on entrepreneurship startup selection and evaluation**

The findings in research question 1 revealed that the impact of AI on entrepreneurship startup selection and evaluation are that AI-driven algorithms helps in identifying high-potential startup opportunities, improve the efficiency of startup selection processes within business incubators and accelerators, enhances the objectivity and fairness of startup evaluation processes, and presents transparency in decision-making processes in startup selection and evaluation. This supports Charles-Owaba (2024), Nambisan (2019) and Bartel (2019).

#### **The impact of AI technologies on entrepreneurship startup growth and sustainability**

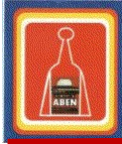
The findings in research question 2 revealed that AI technologies impact entrepreneurship startup growth and sustainability by contributing to growth startup ventures, retention and loyalty of customers, improves adaptability and agility of startup ventures and optimizes operational processes and efficiency of ventures. This supports Nambisan (2019), Charles-Owaba (2024) and Bartel (2019).

#### **The ethical and social implications of AI adoption in entrepreneurship education**

The findings in research question 3 revealed that the ethical and social implications of AI adoption in entrepreneurship education are encroached student privacy and data security, exacerbation of existing inequalities and disparities among students, enhance potential bias and discrimination and influence student autonomy and decision-making. This supports Charles-Owaba (2024), Nambisan (2019) and Bartel (2019).

### **Conclusion**

The exploration of AI integration in business incubators and accelerators reveals significant potential for enhancing entrepreneurship education and fostering startup success. By leveraging AI technologies such as data analytics, machine learning, and predictive modeling, these ecosystems can optimize support systems, streamline decision-making processes, and provide personalized guidance to aspiring entrepreneurs. Empirical research, as highlighted in the literature, underscores the importance of evaluating the effectiveness and ethical implications of AI adoption in driving startup selection, evaluation, growth, and sustainability. As scholars and



practitioners continue to investigate the impact of AI integration, it is essential to prioritize transparency, fairness, and accountability to ensure that AI-driven initiatives contribute positively to entrepreneurship education and startup ecosystems. Through interdisciplinary collaboration and ongoing dialogue, stakeholders can harness the transformative potential of AI to nurture entrepreneurial talent, spur innovation, and create a more inclusive and sustainable entrepreneurial ecosystem.

### **Recommendations**

Based on the findings of the study, the following recommendations were given:

1. Stakeholders should regularly assess the effectiveness and ethical implications of AI-driven initiatives in business incubators and accelerators.
2. The government should prioritize the integration of ethical AI education and training programs within entrepreneurship education curricula.
3. Stakeholders should foster interdisciplinary collaboration and knowledge sharing among researchers, practitioners, policymakers, and industry leaders.
4. The importance of diversity and inclusion in AI development, implementation, and governance.

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