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Impact of Digital Innovation and Artificial Intelligence Adoption on Entrepreneurial Performance

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Abstract **Original Research Articles**

It is a conceptual study conducted on the effects of the adoption of digital innovation and artificial intelligence (AI) to the performance of an entrepreneur particularly the small and medium enterprises (SMEs). This paper discusses the multidimensionality of digital innovation and implementation of AI, namely, technological, organizational, and environmental, which affects the performance of entrepreneurs (that is, up to business growth, operation efficiency, product and process innovation, and market competitiveness). Basing on the Resource-Based View (RBV), Technology-Organization-Environment (TOE) and Innovation Diffusion Theory (IDT), the research paper is able to form a cohesive conceptual framework of the relationships between digital innovation, AI adoption and entrepreneurial orientation to the performance outcomes. The study brings empirical studies conducted on global, regional and Nigerian levels to the fore bringing out mediating effect of entrepreneurial orientation and moderating effect of organizational resources and environmental enablers. The most significant results show that digital innovation and AI adoption have a positive impact on operational efficiency, business development, and business competitive advantage, whereas the lack of digital literacy, resource limitations, and regulatory obstacles may become a hindrance to adoption. The research proposes strategic management intervention, polyfaceted policy frameworks and future research opportunities to maximize AI-based entrepreneurship.

Keywords: Digital Innovation, Artificial Intelligence Adoption, Entrepreneurial Performance, SMEs, Entrepreneurial Orientation, Conceptual Framework.

1.0 Introduction to the Study

1.1 Background of the Study

The international business environment has been changing in a radical way with the introduction of digital innovation and artificial intelligence (AI) in businesses, especially in small and medium-sized enterprises (SMEs). It has been observed that AI has become a significant value-creating activity, which increases operational efficiency, the ability to innovate, and strategic decision-making in organizations all over the world (Jalil, Lynch, Marikan, and Isa, 2025; Soomro, Al-Rahmi, Dahri, Almuqren, Al-Mogren, and Aldaijy, 2025). A company that is highly technologically oriented and has digital capabilities can use AI to create competitive advantage and enhance entrepreneur performances (Vrontis, Chaudhuri, and Chatterjee, 2022). Furthermore, sustainable business practices are enhanced by the incorporation of digital tools so that economic performance would be consistent with environmental and social performance on the global scale (Badghish and Soomro, 2024; Li and Jin, 2024). Digital innovation and AI adoption have since

become a trend in African context as an important facilitator of entrepreneurial rise especially in SMEs that work within resource-starved settings. Researchers observe that the successful implementation of AI and technology solutions are very productive, decision-making, and market responsiveness in African businesses (Perifanis and Kitsios, 2023; Karimi and Mahmoodi Ranani, 2025). Nevertheless, such challenges as infrastructural shortage, lack of digital literacy, and regulatory gaps hinder full-scale adoption, which requires organizational preparedness and strategy alignment (Yadav, Vyas, Kanchan, Ghosal, and Yadav, 2024).

In West Africa, SMEs are becoming more aware that using AI is a channel through which business performance and competitive advantage can be attained in a sustainable way. Empirical research indicates that organisations that use AI to automate their operations, customer analytics, and strategic decision-making realise quantifiable increases in efficiency, innovation output, and value creation (Mardiah, Fikriando, and Syafriani, 2025). To describe the adoption of digital technologies, the Technology-Organization-Environment (TOE) model has been broadly utilized in this area, with much focus made on how technological preparedness, organizational and environmental factors interact to stimulate entrepreneurial performance (Kreiterling, 2023). In Nigeria, the embrace of digital innovation and AI is being proclaimed to become a key to improving entrepreneurial performance and, specifically, in SMEs that deal with competitive environments and changing technology. The studies note that the proactive approach on AI integration, reskilling, and upskilling of staff of the Nigerian SMEs help the companies to be better placed to attain growth, market expansion, and operational efficiency (Aliyu Mohammed, 2023, 2024; Sundararajan and Mohammed, 2023). Moreover, organizational agility, talent management, and digital infrastructure are significant in bridging the gap between the implementation of AI and real performance implementation, which forms a powerful empirical and theoretical basis of the study of the effects of digital innovation and AI adoption on entrepreneurial performance in the Nigerian setting (Aliyu Mohammed, 2023; Li and Jin, 2024).

1.2 Problem Statement

As the use of artificial intelligence (AI) and digital innovation has demonstrated to have the potential to optimize the performance of entrepreneurs in the world, there are still challenges in converting the effects of technological adoption into actual business performance. Research shows that entrepreneurs tend to encounter challenges in successfully incorporating AI into operational and strategic operations which makes the anticipated benefits in efficiency, innovativeness, and decision-making (Gupta, 2024; Komarova and Krawczyk, 2025). Moreover, the role of entrepreneurial orientation and firm-specific capabilities may moderate the success of AI adoption, which implies that the technological implementation itself can not offer the highest performance results (Fatma, 2025; Visuthiphol and Pankham, 2025). Compounded challenges that SMEs face in the African context are restricted digital infrastructure, poor technical expertise, and lack of access to capital, limiting the application of AI technologies (Kumar, Mohammed, Raj, and Sundararajan, 2024; Lawal, Abdulsalam, Mohammed, and Sundararajan, 2023). Despite the potential of AI to provide sustainable performance enhancements, the African entrepreneurs are usually unable to align AI implementation with the strategic goals, thus limiting possible improvements in operational performance, market growth, and potential level of innovation (Mohammed, 2023; Mohammed, 2023).

The adoption of AI and digital innovation into the business models of SMEs is not consistent in West Africa. The empirical data indicate that some businesses attain quantifiable gains in productivity and competitive advantage whereas others fail because of the insufficient organizational preparedness, managerial potential, and misfit between technology introduction and entrepreneurial plans (Kim and Jin, 2024; AI Adoption and Digital Entrepreneurial Intentions, 2025). The difference shows that there is an urgent necessity to examine how contextual conditions, including firm size, digital literacy, and market dynamics, influence the influence of AI on entrepreneurial performance. In

Nigeria, SMEs have their own set of problems that prevent the maximum use of AI and digital innovation. The inability of Nigerian entrepreneurs to capitalize on AI as a means of sustainable business performance is limited by lack of access to finance, skills and infrastructural gaps (Alsharah, 2025; Badghish, 2024; Bankole, 2024; Biedima, 2023). Also, scarce empirical studies have been conducted to associate AI adoption and entrepreneur performance in the Nigerian SME industry, which creates a research gap on the mechanisms that involve digital capabilities, organizational support, and strategic orientation in generating performance outcomes. This gap is important to be addressed to provide an opportunity to guide policymakers, business leaders, and entrepreneurs to ensure the maximization of the benefits of AI implementation to grow a business on a sustainable basis.

1.3 Significance of the Study

The relevance of this research can be explained by the fact that it will have the potential to present both empirical and theoretical data on how the adoption of digital innovation and artificial intelligence (AI) can affect the performance of entrepreneurs worldwide. As more and more entrepreneurs start to use the power of generative AI, like ChatGPT, it is important to learn more about how AI can contribute to business value so as to create a better strategy, innovation, and competitive advantage (Gupta and Yang, 2024). The given work is worth adding to the global discussion of AI usage as it shows how the progressive development of SMEs can be promoted through the technological implementation, which is moderated by the entrepreneurial orientation (Al-Ramahi et al., 2024; Saleem, Hoque, Tashfeen, and Weller, 2023). At the regional level, the study will be valuable to the policymakers and business practitioners in that the digital adoption strategies and entrepreneurial orientation interplay to determine the performance outcomes. Machine learning studies highlight the importance of the fact that companies that manage to use digital technologies effectively are able to produce better levels of innovation, operational performance, and market responsiveness (Danesh, Moterased, Sakhdari, and Faghih, 2024). Specifically, the research relates to the increasing demand to develop practical knowledge regarding how to organize AI-driven operations and capabilities that will optimise entrepreneurial performance in the variety of business settings. The African context provided in the research provides an understanding of effective interventions that SMEs may utilize to build resilient digital infrastructure, improve the level of technological proficiency, and align organizational processes with the implementation of AI interventions. The study can determine strategies to enhance efficiency, decision-making, and sustainability outcomes by analyzing the frameworks of the policy and management information systems (Mohammed, 2023; Mohammed and Sundararajan, 2023). These are the insights that are imperative in bridging the digital preparedness gaps and providing a roadmap that SMEs may undertake towards long-term performance improvements in the high-speed changing markets. In particular, to Nigerian entrepreneurs and SMEs, the research becomes a point of reference with regards to the current level of adoption of AI and the strategic implication of the digital innovation. The conclusions of the comparative research on the new normal of AI adoption draw attention to the phases of awareness, pilot testing, and integration and, therefore, assist companies in increasing AI investments in an effective and sustainable way (Schwaeke et al., 2025; Cimino, 2024; Galang, 2024; Schwaeke, Hoffmann, and Buhl, 2025). By connecting theory and practice, the research will allow to improve entrepreneurial decision-making, policy making and sustainable development of technology-driven business environments.

1.4 Research Objectives

The study seeks to achieve the following objectives:

1. To examine the impact of digital innovation adoption on entrepreneurial performance.
2. To assess the influence of artificial intelligence adoption on operational efficiency and business growth in SMEs.

3. To investigate the mediating role of entrepreneurial orientation in the relationship between AI adoption and entrepreneurial performance.
4. To explore the challenges and opportunities associated with integrating digital innovation and AI into entrepreneurial activities.

1.5 Research Questions

The study seeks to answer the following questions:

1. How does digital innovation adoption affect entrepreneurial performance?
2. What is the influence of artificial intelligence adoption on operational efficiency and business growth in SMEs?
3. How does entrepreneurial orientation mediate the relationship between AI adoption and entrepreneurial performance?
4. What are the key challenges and opportunities in integrating digital innovation and AI into entrepreneurial practices?

2.0 Literature Review

2.1 Conceptual Framework

This study has a conceptual framework with relationship between Digital Innovation and Artificial Intelligence (AI) Adoption is the multidimensional independent variable (IV) and Entrepreneurial Performance is the unidimensional dependent variable (DV). The digital innovation and artificial intelligence implementation consist of technological, organization and environmental aspects, which, in turn, have a direct impact on overall performance of the entrepreneurial activities. In this section, these constructs and their dimensions are described.

2.1.1 Independent Variable (IV): Digital Innovation and Artificial Intelligence Adoption

Digital innovation can be defined as the deployment of new digital tools, platforms, and processes in order to optimize business operations and AI adoption can be defined as the deployment of intelligent systems that can automate decision-making processes, predictive analytics, and optimization of business operations (Manigandan and Raghuram, 2024; Wicaksono et al., 2024). The combination of the two enable SMEs to be efficient, flexible and competitive in a dynamic business environment.

2.1.1.1 Technological Dimension

Technological aspect focus on the use of AI tools and systems such as machine-based learning algorithms, natural language processing and intelligent analytics platforms, which increase decision-making and operational efficiency (Kurniawan and Prihandono 2025). Moreover, robust digital infrastructure and platforms (e. g. cloud computing, electronic commerce portal, collaborative digital tools etc.) is an important driver for sustainable digital transformation (Awal & Chowdhury, 2024). Moreover, automation, analytics, and decision-making based on the premise of data enable SMEs to better control the resource, anticipate the market trend, and become more responsive to new opportunities, which enhances the results of the performance (Manigandan and Raghuram, 2024; Wicaksono et al., 2024).

2.1.1.2 Organizational Dimension

The organizational aspect is represented by such variables as management support and digital culture that play a key role in the successful implementation of AI and digital innovation (Mohammed, Shanmugam, Subramani and Pal, 2024). Technology agility and readiness also enables the organizations to upscale the processes in a short given time, re-organize the teams, and harness the AI potential towards strategic goals (Mohammed, Sundararajan, and Lawal, 2022). In addition, the capabilities of human capital and digital literacy are crucial as experienced employees will allow the unproblematic implementation of solutions on AI-driven platforms and help to keep them aligned with the strategic goals (Shanmugam Sundararajan et al., 2024).

2.1.1.3 Environmental Dimension

The environmental aspect focuses on

externalities that affect the use of AI and digital innovation. The dynamism in the market and the competitive environment compel the SMEs to embrace new and sophisticated digital tools to ensure they remain relevant and are able to capitalize on the market (Dixon, 2025). The policy and regulatory environment also plays a role in adoption decisions, especially those jurisdictions that have incentives or structures that favor technological integration (OECD, 2025). Lastly, social influence and customer-centric orientation emphasize the value of stakeholder expectations, such as clients, partners, and network in the industry, in driving firms to adopt AI and digital solutions (Jang, 2025; Amin, 2025).

2.1.2 Dependent Variable (DV): Entrepreneurial Performance

Entrepreneurial performance is the success and effectiveness of a venture in attaining strategic objectives including growth, innovation, efficiency and competitive positioning. It is the outcome variable in the case and is dependent on the level and type of digital innovation and AI adoption (Felicetti, Brambilla, and Peruffo, 2024).

2.1.2.1 Business Growth and Revenue Expansion

The successful entrepreneurship is reflected in the growth of business and the increase of revenues. When companies are digital and use AI, they gain increased operating capacity, utilize more resources, and reach more markets, which contribute to increasing revenues (Manigandan and Raghuram, 2024; Wicaksono et al., 2024). These technologies allow making knowledge-driven decisions that facilitate the introduction of new products, the diversification of services, and the expansion into new markets (Awal & Chowdhury, 2024).

2.1.2.2 Product and Process Innovation

Product and process innovation is promoted with the help of AI and digital innovation, which allows SMEs to create new products and simplify the working process. With the help of predictive analytics and automated solutions, companies can improve product quality, minimize time-to-market, and be able to effectively react to changing customer needs (Kurniawan and Prihandono, 2025; Manigandan and Raghuram, 2024). Innovation, in its turn, is a vital source of competitive advantage and a long-term business performance.

2.1.2.3 Operational Efficiency

Operational efficiency is a high level of resource exploitation to get preferred results. The implementation of AI contributes to efficiency through the abolition of repetitive processes, reduction of mistakes, real-time performance metrics (Wicaksono et al., 2024). Moreover, digital tools enhance the coordination of departments, the management of supply chains, and the costs of operation, which improve the performance of entrepreneurs (Manigandan and Raghuram, 2024).

2.1.2.4 Market Competitiveness

Competitiveness in the marketplace suggests the ability of a firm to compete in the market with the competition. AI and digital innovation can improve the competitive positioning of SMEs by giving them the capacity to be responsive to market trends, improve customer interaction and facilitate differentiation by providing unique products and services (Jang, 2025; Amin, 2025). The digital transformation in the entrepreneurial activities has strategic benefits, thus making them stronger and flexible in dynamic market conditions (Felicetti, Brambilla, and Peruffo, 2024).

2.1.3 Relationships between IV and DV

2.1.3 Interrelationships between IV and DV

The correlation between digital innovation and adoption of AI (IV) and entrepreneurial performance (DV) is complex, and each of the components of the independent variable separate but linked effect performances. The technological aspect i.e. AI tools, digital platforms, analytics increase the performances of entrepreneurs directly as it allows the firm to automate their process and improve on the decision making process and find new opportunities in the market (Manigandan and Raghuram, 2024; Wicaksono et al., 2024). By the utilization of these technologies, firms are able to increase their business growth at a faster rate, improve operational efficiency and develop new products and services,

which will allow them to improve their competitive advantage in the market (Kurniawan and Prihandono, 2025). The organizational aspect-management support, digital culture, human capital capabilities, and organizational agility defines how well technology implementation is implemented to achieve desired results. Research has emphasized that even the high-level AI systems might not bring significant performance improvements in case of the lack of strong leadership support, the presence of the enabling digital culture, and well-trained staff (Mohammed, Shanmugam, Subramani, and Pal, 2024; Shanmugam Sundararajan et al., 2024). Organizational preparedness and digital literacy moderate the connection between technology adoption and entrepreneurial performance, which makes sure that innovations are adopted efficiently and aligned with the strategic objectives (Mohammed, Sundararajan, and Lawal, 2022).

The environmental aspect that includes market dynamism, rivalry forces, regulatory systems and societal factors mediate the effect of digital innovation and AI implementation on the performance. It is more likely to see the improved performance results of the entrepreneurial venture that works in a highly dynamic market or has favorable regulatory policies, as the external factors stimulate or restrict the activities of the innovation (Dixon, 2025; OECD, 2025). The adoption behaviors are also influenced by the customer expectations and social influence, which affects the growth of the revenue, product innovation, and competitiveness in the market (Jang, 2025; Amin, 2025). Additionally, organizational capabilities and strategic orientation tend to mediate the relations. As an example, entrepreneurial orientation, absorptive capacity, and innovation culture can contribute to the firm using digital and AI technologies to achieve better results (Manigandan and Raghuram, 2024; Wicaksono et al., 2024). In the same way, managerial attitude, human resource strategies, and training interventions are some of the moderating factors that can increase or reduce the effects of AI adoption on entrepreneurial performance (Mohammed, Jakada, and Lawal, 2023; Mohammed, Shanmugam, Subramani, and Pal, 2024). Comprising these interrelations, it is implied that digital innovation and AI adoption is not a solitary phenomenon; its impact on the entrepreneurial performance is not the same across all organizations because it depends on organizational preparedness, external landscape, and alignment to strategy.

2.2 Theoretical Framework

2.2.1 Resource-Based View (RBV)

Resource-Based View (RBV) assumes that the competitive advantage of a firm is caused by its own rare and non-substitutable resources and capabilities that are valuable and unique and can be imitated (Fu, Ni, and Fang, 2025). Organizational resources in the digital innovation and the use of AI, including technological infrastructure, proficient human resource and managerial skills, are essential resources that can allow firms to use AI to achieve better entrepreneurial performance. The enterprises can enhance their operational efficiency, promote product and process innovation, and sustainably develop their business by investing in advanced digital tools and developing a workforce that can interpret and utilize AI-driven insights (Sundararajan and Mohammed, 2022; Mubarak, 2019). RBV says these resources need to be strategically aligned to organizational goals to be transformed into a definite performance advantage.

2.2.2 Technology–Organization–Environment (TOE) Framework

TOE framework elucidates technology adoption based on three contextual factors, including technological, organizational, and environmental factors (ul Haq, 2025; Dabbous and Boustani, 2023). At the technological level, companies have to be equipped with preparedness regarding the digital infrastructure, AI applications, and data analytics skills. Managerial support, organizational culture that supports innovation, and digital literacy of employees are organizational preparedness factors. The enablers of environmental factors are the competitive forces, the dynamism of the market, and the policies of the government that enable the adoption or inhibit it. Using TOE to AI adoption, companies exhibiting high technological and organizational preparedness, and that are located in desirable environmental conditions have higher

chances of successfully adopting AI, hence improving their performance as entrepreneurs (Fossen, 2024; Sundararajan, Mohammed, and Lawal, 2023).

2.2.3 Innovation Diffusion Theory (IDT)

The Innovation Diffusion Theory (IDT) is the study on how, why, and the rate at which new technologies diffuse into a social system (Fu, Ni, and Fang, 2025). Relative advantage, compatibility, complexity, trialability, and observability are the main determinants of digital technologies and AI adoption by entrepreneurial ventures. Pragmatically, in cases where AI solutions prove to be significantly more valuable than their traditional counterparts and correspond with the current business operations, there are more likely to be adopted by SMEs, leading to better efficiency, innovation, and competitiveness in the market (Fossen, 2024). According to IDT, perceived usefulness and ease of adoption are key factors that determine the adoption of technology, which has a direct relationship with the outcomes of entrepreneurial performance.

2.2.4 Integration of Theories: Linkages between IV and DV

By integrating RBV, TOE and IDT, an effective theoretical framework for explaining the influence of digital innovation and adoption of AI on performance of an entrepreneur is created. RBV emphasizes the internal strength and facilities that are needed to successfully introduce AI, TOE puts the process of adoption in the context of technological, organizational, and environmental factors, and IDT clarifies how innovations are adopted and how perceptions influence their acceptance. Together, these theories imply that the highest performance of an entrepreneur is achieved when a firm has valuable resources, an organizational readiness, and views AI adoption as an opportunity to complement and/or support its strategic goals (Fu, Ni, and Fang, 2025; Mubarak, 2019; ul Haq, 2025).

2.2.5 Theoretical Framework Figure

The improved version introduces a systematic and hierarchical model that combines three key theories RBV, TOE and IDT to elucidate digital innovation and AI adoption as it leads to entrepreneurial performance. Both theoretical perspectives introduce sets of multidimensional determinants, which are conveniently divided into separate subsets. These theoretical variables are at the input of the independent variable (digital innovation and AI adoption) that then influence the dependent variable (entrepreneurial performance).

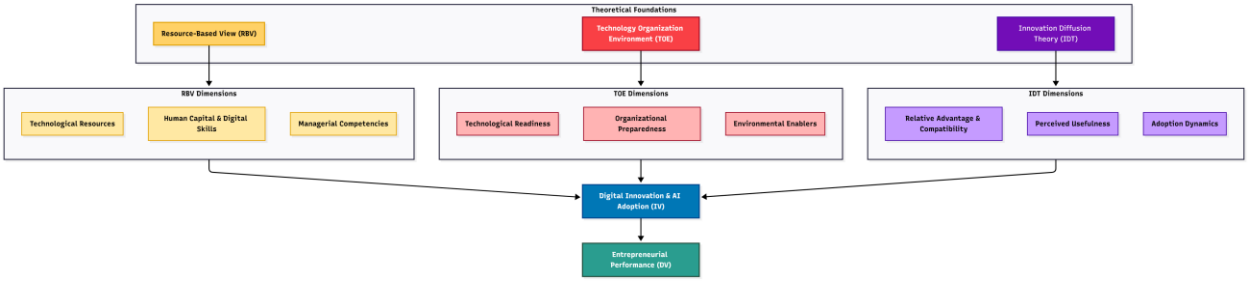

Figure 2.1: Enhanced Model of the Study Integrating RBV, TOE, and IDT

Source: Researcher's Design (2025)

The model is improved by emphasizing the fact that the performance of entrepreneurs is the result of a complicated combination of internal capabilities, organizational conditions, environmental factors, and innovation adoption behaviours. The dimensions of the RBV reinforce the resource and capability base of a firm, the TOE factors determine its preparedness and external assistance to digital transformation, and the IDT factors demonstrate the effects of perception on digital innovation adoption rate and success.

These determinants combine into the independent variable digital innovation and AI adoption, which is a direct cause of entrepreneurial performance. The systematic subgraphs visually underline the interplay of various theoretical frameworks explaining the outcomes of competitive results by a combination of digital factors.

2.3 Empirical Reviews

The scientific community agrees that the worldwide use of digital innovation and artificial intelligence (AI) can contribute to the better performance of SMEs considerably. The study by Jalil et al. (2025) indicated a mediating role of technological orientation between AI adoption and digital value creation and the significance of strategic alignment in the attainment of the business results. In a similar manner, Soomro et al. (2025) used a SEMANN framework to demonstrate that AI technologies have a positive effect on sustainable performance due to their ability to enhance the efficiency of decision-making and operational performance and innovativeness. These findings are supported by other studies in Europe and Asia, and their research on Germany and Thailand proved that the decision-making process in digital processes assisted with AI enables innovativeness, agility, and competitiveness in the market (Saleem, Hoque, Tashfeen, and Weller, 2023; Visuthiphol and Pankham, 2025). Moreover, studies point to the moderating effect brought forth by entrepreneurial orientation that means companies with proactive, innovative, and risk-taking cultures are in a better position to use AI to achieve better performance outcomes (Fatma, 2025; Gupta, 2024). SMEs are impacted by different technological, organizational and environmental challenges in the African and the Nigerian context. Indicatively, Mohammed, Shanmugam, Subramani, and Pal (2024) have seen that strategic human resource management mediates the impact that entrepreneurial ventures have on sustainable growth, and the issue of organizational capabilities is central in the adoption of AI. In Kano State, Nigeria, Mohammed, Sundararajan, and Lawal (2022) found that specialized training produces a considerable increase in SMEs ability to introduce digital innovations and increase performance. Likewise, it is reported by regional studies in India and other West African countries that the use of digital technology, coupled with entrepreneurial marketing and creating social value, reinforces the growth of business, its efficiency, and competitiveness in the market (Manigandan & Raghuram, 2024; Vrontis, Chaudhuri, and Chatterjee, 2022). All these studies highlight the possibilities of the use of AI in resource-strained settings, but also indicate the lack of technological infrastructure, digital literacy, and enabling policies (Li and Jin, 2024; Kurningwan and Prihandono, 2025).

Applying evidence from the world and regions, it is obvious that AI and digital innovations contribute to improving the performance of entrepreneurs by increasing the quality of their decision-making, automating processes, and being responsive to market requirements. Mediator and moderating variables, including the organizational culture, the support of managers, the digital literacy, and the entrepreneurial orientation, play a critical role in the level of performance gains (Danesh, Moterased, Sakhdari, and Faghih, 2024; Liu and Wang, 2024). It is likely that SMEs that are strategically endowed in terms of technological, organizational, and environmental resources are going to attain greater degrees of innovation, operational efficiency, and market competitiveness. In spite of these developments, situational constraints, such as the lack of infrastructure, the inaccessibility of AI products, and the insufficiency of digital literacy, are still heavy burdens in most emerging economies, especially in Nigeria and West Africa (Talebi, Ghasemi, Nobari, and Seraj, 2025; Mohammed, 2023).

2.4 Research Gap

Although there is a huge body of research pointing at the positive impact of implementation of AI and the digital revolution, there are still some important gaps in both theory and practice. Most of the theoretical frameworks are highly skewed on technological or organisational issues; they fail to integrate multidimensional model such as RBV, TOE, IDT in understanding the complex nature of resources, environmental factors and adoption of

innovation. Empirical literature in this field also has a tendency of focusing on developed economies, and there has been little evidence in SMEs which operate in resource-constrained African settings, especially the joint effect of AI adoption and entrepreneurial orientation on performance results (Komarova and Krawczyk, 2025; Awal and Chowdhury, 2024). Some studies are methodologically based on cross-sectional designs, which do not allow engaging dynamic impacts of AI adoption on the performance of entrepreneurs over time. Also, few studies have used mixed-method or sophisticated analytical methods, like SEM- ANN and machine learning to examine mediating and moderating relations in details. Discussing them will give better insights into the contextual and organizational elements that enable the successful adoption of digital innovation and the achievements of sustainable entrepreneurial performance in SMEs in Africa and Nigeria in particular (Danesh, Moterased, Sakhdari, and Faghih, 2024; Li and Jin, 2024).

2.5 Model of the Study

The experiment takes the conceptual model where the multi-dimensional discrete variables (IV) Digital Innovation and Artificial Intelligence Adoption are related to the unidimensional variable (DV) Entrepreneurial Performance. The IV is a multidimensional one as it includes technological, organizational, and environmental aspects, which have varying impacts on performance results (Sundararajan, Mohammed, and Senthil Kumar, 2023; Bankole, 2024; Alsharah, 2025). The DV is a unidimensional scale with its outcomes being business growth, innovation, operational efficiency, and market competitiveness. Mediating and moderating factors are also included in the model and have the potential to reinforce the character and strength of the relationship between IV and DV. As an example, the managerial support, organizational agility, and digital literacy are the significant mediators to improve the adoption-effectiveness connection (Sundararajan, Mohammed, and Senthil Kumar, 2022). In the same way, the moderating roles are played by entrepreneurial orientation, the dynamism in the market, and regulatory environment that define how digital innovation and AI adoption will translate into better performance (Badghish, 2024; Bankole, 2024). Such a framework can be used to gain an in-depth overview of the way in which SMEs, especially emerging ones, such as that in Nigeria, can use AI and digital innovation to establish sustainable performance. It also offers the theoretical foundation of associating Resource-Based View (RBV), Technology-Organization-Environment (TOE), and Innovation Diffusion Theory (IDT) to entrepreneurial performance, which would give an answer to the gap between the adoption of technology and the quantifiable business success.

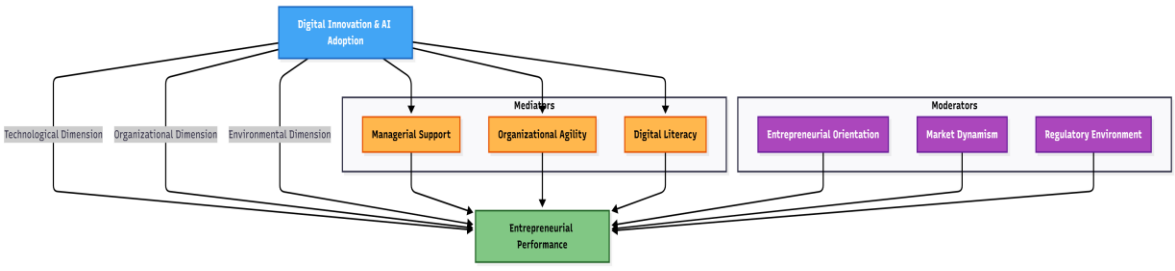

Figure 2.2: Model of the Study Linking Digital Innovation & AI Adoption to Entrepreneurial Performance

Source: Researcher's Design (2025)

The Model of the Study that is related to Digital Innovation and AI Adoption to Entrepreneurial Performance is shown in Figure 2.2. The independent variable (IV) is signified in three dimensions technological, organizational, and environmental. The model takes into account

mediators (managerial support, organizational agility, and digital literacy) that illustrate the means of getting performance results due to digital innovation. There are also moderators (entrepreneurial orientation, market dynamism and regulatory environment) to determine how the contextual variables can either strengthen or weaken these associations. The model emphasizes the fact that digital innovations and AI usage will not be sufficient on their own to drive the performance of an entrepreneur. An elevated organizational agility, effective managerial support, and productive internet literacy may be essential transforming the technological and organizational innovations into the real performance enhancement. In addition, the model underlines that entrepreneurial orientation, dynamism in the market, and regulatory environment, are important boundary conditions, which determine the strength of the IVDV relation. Generally, the framework provides the comprehensive view as far as the influence of the technological, organizational and contextual setting in the interaction to generate entrepreneurial results in the dynamic business settings are concerned.

3.0 Research Methodology

In this chapter, the authors introduce the research methodology used in their research that adopts a conceptual research approach to study the impact of adoption of digital innovation and artificial intelligence (AI) on the performance of an entrepreneur. The methodology provides a systematic approach to the synthesis of the previous literature, a combination of theoretical approaches, and the creation of a comprehensive conceptual framework which is relevant to the aims of the study along with the research questions.

3.1 Research Design

The theoretical research design which is adopted in the study focuses on theoretical investigation, synthesis of the literature and development of models as opposed to collection of empirical data. Complex relationships like the multidimensional impact of digital innovation and AI adoption on entrepreneur performance suit conceptual research to comprehend. By precaution and synthesis of the available global and regional literature, this study determines the influential drivers, mediators, and moderators of entrepreneurial performance. The research design enables the methodical definition of patterns, tendencies, and gaps in the current body of knowledge, which makes it easy to develop a sound conceptual framework (Sundararajan, Mohammed, and Senthil Kumar, 2023; Bankole, 2024).

3.2 Nature of the Study

This study is purely conceptual because it will be based on extensive review of academic literature, theoretical frameworks as well as previous empirical studies in order to develop the relationships between variables. With the conceptual approach, a study gets the opportunity to work out the multidimensional character of digital innovation and AI adoption and correlate it with unidimensional entrepreneurial performance. This will focus on theoretical synthesis, including the addition of Resource-Based View (RBV), Technology-Organization-Environment (TOE) and Innovation Diffusion Theory (IDT), which, together, will form the basis of how digital technologies affect business outcomes (Fu, Ni, and Fang, 2025; Dabbous and Boustani, 2023). The study offers a strategic perspective on the concept of digital transformation and AI-driven entrepreneurship through the attention to concepts and constructs, as opposed to field data.

3.3 Data Sources and Literature Selection Criteria

The studies rely on the secondary sources in the form of peer-reviewed journal articles, conference papers, books, and official reports selected on the criteria of relevancy, topicality and validity. In order to ensure as relevant as possible research, we focused on the research being published within the last five years, particularly in the constantly evolving area of AI and digital innovation. Such databases as ScienceDirect, Springer, Wiley, MDPI, and Scopus were searched and narrowed down to SMEs, entrepreneurship, and technology adoption. The inclusion criteria included that the study must have specifically addressed the topic of digital innovation, adoption of AI,

entrepreneurial performance or theoretical frameworks (Soomro et al., 2025, Jalil et al., 2025). Exclusion criteria were also conducted to eliminate papers of no empirical or theoretical rigor, old analysis or non-relatedness to the variables of interest.

3.4 Analytical Techniques for Conceptual Synthesis

To give conceptualization to the literature, the research adopts a narrative and integrative analytical approach that involves the identification of themes, patterns and interrelationships among the studies. The cross-linked most significant constructs and dimensions of digital innovation and AI adoption were connected with the performance outcomes of the entrepreneurial performance with the mediating and moderating factors. The comparative analysis was done at both the global level and regional level as well as the Nigerian context to analyse the difference in context and applicability. Clustering of the results in technological, organizational, and environmental dimensions and integrating the findings with the theoretical frameworks to come up with the model of the study also constituted the conceptual synthesis (Manigandan and Raghuram, 2024; Wicaksono et al., 2024).

3.5 Justification for Using a Conceptual Framework

The fact that the relationships are a complex and multidimensional nature that is not easily determined solely through primary data is the reason the conceptual framework can be considered justifiable. Conceptual frameworks give a structured description of the variables, the relation, and the issues of the context that are capable of developing theories and offer knowledge that is practical. The influence of the technological, organizational and environmental factors of the digital innovation and adoption of AI to influence the work of an entrepreneur can be presented in the framework of the present research with the emphasis on potential mediators and moderators. The framework also offers the basis of the further empirical research that will offer the authors the idea of how to operationalize and test hypotheses concerning the context of SMEs and other entrepreneurial settings (Sundararajan, Mohammed, and Senthil Kumar, 2023; Bankole, 2024).

4.0 Findings of the Study

4.1 Synthesis of Literature Findings

1. Digital innovation has a great effect in enhancing the performance of entrepreneurs in terms of their business operations, product innovation, and the expansion of the market (Jalil et al., 2025; Vrontis, Chaudhuri, and Chatterjee, 2022).

2. The use of artificial intelligence (AI) has a positive impact on the efficiency of operations and business development among the SMEs, including the automation, data-driven decision making, as well as predictive analytics (Soomro et al. 2025; Li and Jin 2024).

3. Entrepreneurial orientation is also used as one of the most critical mediators between AI adoption and performance and the advantages of AI adoption are amplified by the innovative, active, and risk taking entrepreneurial behaviours (Danesh et al, 2024; Dixon, 2025).

4. Although there are significant opportunities of digital innovation and AI, the SMEs are facing some problems, which would include technological preparedness, lack of digital skills, high implementation costs, and even regulatory limitations (Karimi and Mahmoodi Ranani, 2025; Badghish, 2024).

4.2 Relationships between Digital Innovation, AI Adoption, and Entrepreneurial Performance

1. Digital innovation has a big role in the performance of entrepreneurship, which are aspects of technological, organizational, and environmental, the approaches needs to be jointly (Manigandan and Raghuram, 2024; Wicaksono et al., 2024).

2. The adoption of AI is meant to make the business processes more efficient as they make the processes easier, eliminate mistakes and minimize the consumption of resources, which directly lead to the expansion of the business (Fu, Ni, and Fang, 2025; Mardiah, Fikriando, and Syafriani, 2025).

3. It implies that more successful performances are witnessed among SMEs that are inclined to both AI use and high entrepreneurial orientation and it can be concluded that there is a synergistic relation between technology and entrepreneurship spirit (Talebi et al., 2025; Yadav et al., 2024).

4. The success of AI and digital innovation in improving the performance of entrepreneurship can be limited by barriers which include the difference in digital literacy rate, lack of managerial support and inappropriate infrastructure (Karimi and Mahmoodi Ranani, 2025; Awal and Chowdhury, 2024).

4.3 Summary of Conceptual Insights

1. Both the technological, organizational, and environmental sides of digital innovation and the adoption of AI play a crucial role in ensuring sustainable entrepreneurial performace (Sundararajan, Mohammed, and Senthil Kumar, 2023; Bankole, 2024).

2. The use of AI promotes efficiency, as well as the driver of innovations, competitive advantage, contributes to the development of SMEs in dynamic markets (Badghish, 2024; Li and Jin, 2024).

3. The entrepreneurial orientation creates a gap between the technological adoption and performance that focus on the value of proactive and innovative efforts (Danesh et al., 2024; Dixon, 2025).

4. Although all these are advantages, there are SMEs that have contextual challenges which require strategic and policy interventions, they include regulatory challenges, high cost of investments and skills gaps (Karimi and Mahmoodi Ranani, 2025; Alsharah, 2025).

5.0 Recommendations of the Study

5.1 Managerial Recommendations for Entrepreneurs

1. Digital innovations should be strategically accepted by entrepreneurs to simplify their operations, to promote innovation and reach a larger audience in the market.

2. To achieve operational efficiency and business improvement, SMEs are recommended to incorporate AI to automate the processes, make predictive analytics, and make decisions based on the available data.

3. The benefits of adopting AI can be maximized by developing entrepreneurial orientation by being proactive, innovative, and risk-taking.

4. One of the ways of overcoming the skill gaps would be to invest in digital literacy and human capital development in order to achieve successful technology integration.

5.2 Policy Implications for SMEs and Regulatory Bodies

1. Privatization policy-makers can establish incentives and support services to SMEs to embrace AI and digital innovation to lower the cost of its implementation.

2. The authorities should also develop clear rules and guidelines on the use of AI to make sure that people comply with them and minimize the risks associated with their operations.

3. The governments ought to stimulate the creation of digital infrastructure and the use of AI tools, particularly among small and medium-sized businesses.

4. The government, academia and industry should be encouraged to engage in collaborative efforts that would help in developing digital and entrepreneurial capacity within the SMEs.

5.3 Recommendations for Future Research

1. The proposed conceptual framework should be empirically tested in other sectors of SMEs in the future to establish the relationships among digital innovation, AI adoption and entrepreneurial performance.

2. The research study should focus on the cost-effectiveness of the AI in the long-term, business development, and competitiveness in the market.

3. Future research ought to seek other mediating and moderating variables, like the leadership, organizational culture and financial ability in the adoption and performance results of AI.

4. It is suggested that comparative study at the global,

regional, and Nigerian levels should be conducted in order to reveal contextual differences in digital innovation adoption and entrepreneurial performance.

6.0 Conclusion

The paper emphasizes the importance of adoption of digital innovation and artificial intelligence (AI) in optimizing the performance of the entrepreneur. SMEs that take advantage of AI and digital technologies worldwide are more efficient in their operations, innovative in products and processes, and grow their businesses (Jalil et al., 2025; Soomro et al., 2025). The organizational and environmental aspects, including the management support, the digital culture, the dynamism of markets, and regulatory measures play a crucial role in making the adoption successful (Manigandan and Raghuram, 2024; Wicaksono et al., 2024). Entrepreneurial orientation becomes an important mediator, which provides support for the relationship between the adoption of AI and the performance outcomes, issues with digital literacy, limited resources, and regulatory restrictions can stand in the way of the best results (Danesh et al., 2024; Karimi and Mahmoodi Ranani, 2025). Digital innovation and adoption of AI are not a choice of the SMEs that are interested in long-term growth, it is a strategic necessity. Such technologies are potentially capable of changing the business operation, making it more competitive, and adding value in the long-term, when combined with proactive entrepreneurial orientation and strong organizational resources (Badghish, 2024; Bankole, 2024). Nonetheless, in order to effect it successfully, it is necessary to counter the technological, organizational and environmental obstacles by means of managerial foresight, capacity building and favourable policy frameworks. In general, the paper highlights that the synergistic partnership of AI implementation, digital innovation and entrepreneurial mindset is critical towards realizing excellent entrepreneurial performance in modern business settings.

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