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Impact of Digital Innovation and Software Development on Entrepreneurial Performance

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ABSTRACT: The high rate of digital innovation and software development has reshaped the entrepreneurial environment, but several small and medium-sized enterprises (SMEs) in the new economies have faced challenges in utilizing these technologies. It is a conceptual paper that studies the role of digital innovation and software development in the performance of the entrepreneur with emphasis on how technological adoption, managerial ability, and strategic alignment contribute to the performance of the innovation and competitiveness. The research paper shows an increasing research gap in terms of how the capability to digital transformation can be converted into quantifiable entrepreneurial success. The paper has incorporated the views of the Resource-Based View (RBV), Dynamic Capabilities Theory and the Entrepreneurial Orientation Theory, using a conceptual approach that relies on secondary data, comprising scholarly journals, books, reports as well as historical analyses. The literature review indicates that companies that make use of digital tools, agile systems, and software solutions gain flexibility in their operations, the presence of innovation, and long-term growth. Nonetheless, poor leadership, digital skills, and institutional support are important obstacles. The research suggests the implementation of combined digital solutions, the investment in human resources growth, and enhancement of the policy frameworks that would foster the innovation ecosystems. In general, digital innovation and software capabilities play a key role in improving performance and resilience of entrepreneurs in a rapidly competitive and technological world.

KEYWORDS: Digital Innovation, Software Development, Entrepreneurial Performance, Dynamic Capabilities, SMEs.

INTRODUCTION

1.1 Background of the Study

Digital transformation has become one of the most important strategies of companies that want to gain a competitive edge in the modern markets. The implementation of digital technologies affects organizational processes, the ability to innovate and the overall performance of the organization (Ferreira, Fernandes, and Ferreira, 2019; Nicola and Setiawan, 2024; On go Nkoa and Song, 2023). Digitalization helps not only to become more efficient in the operation but also to provide new opportunities in the market by means of innovative products and services (Wang, S., & Zhang, 2025; Mollah et al., 2024).

Studies indicate that entrepreneurial leadership and manager profile is instrumental in utilizing digital processes to gain an advantage in the organization (Aliyu Mohammed, 2023; Mohammed, 2023). Besides, the adoption of digital is closely related to the performance of innovation and sustainable growth in small and medium-sized enterprises (SMEs) (Rupeika-Apoga, Petrovska, and Bule, 2022; Mohammed, Shanmugam, Subramani, and Pal, 2024). This paper, thus, is placed in the context of the general literature on digital transformation, innovation, and performance, to be able to find out what drives the adoption of digital and what its impact would be on the competitiveness of firms.

1.2 Problem Statement

Regardless of the recent rise in awareness of digital transformation, the research gap that still exists is how the incorporation of digital processes directly influences the capabilities of innovation and the performance of firms (Kuester et al., 2018; Nambisan et al., 2017). In particular, as much as large corporations have been already deeply examined, SMEs and startups have their own challenges: due to limited resources, insufficient digitalization, and fluctuating market, they are exposed to specific difficulties (Chen et al., 2021; Wang, Y., Wang, T., and Wang, Q., 2024; Mohammed, 2023). Moreover, in spite of the fact that many studies emphasize the role of digital leadership and organizational culture in building transformation, it is possible to note that the situational aspects, such as governmental support, environmental dynamism, and managerial attitudes, are under-researched (Mollah et al., 2024; Rodrigues, Oliveira, and Rodrigues, 2023; Shanmugam Sundararajan et al., 2024). Consequently, the given research work responds to the burning issue of determining the most influential factors of digital adoption and assessing the impact of the factors on productive results in the performance of organizations in a range of environments.

1.3 Significance of the Study

The results of this research are practical, managerial and theoretical. In practice, they offer information to business leaders and policymakers on the ways to enact digital strategies that promote innovation and a competitive advantage (Phiri, 2020; Chen et al., 2021). As a manager, the interconnection of digital adoption, leadership, and innovation can be used to make a strategy in the SMEs and start ups that are constrained by resources (Mohammed and Sundararajan, 2023; Aliyu Mohammed, 2024).

Theoretically, the research offers multiple views to the knowledge base on digital transformation and innovation management that combines various perspectives, such as the Resource-Based View, Systems Theory, and notions of digital leadership (Ji, Miao, Wan, and Lin, 2024; Wang and Zhang, 2025). Besides, it widens the scope of understanding about the influence of digitalization on entrepreneurial activities, managerial activities, and overall performance of organizations (Mohammed, Jakada, and Lawal, 2023; Sundararajan and Mohammed, 2023).

Through these relationships, the study will help in bridging the gap between the current research on digital transformation and its application especially in SMEs and technology driven organizations within the emerging markets.

1.4 Research Objectives

The primary aim of the research is to discuss the impact of digital transformation, which is realized through the implementation of novel digital processes, on organizational innovation capacity and business success. To do so, the following specific objectives are established in the study:

1. To find out the determinants of the adoption of digital technologies and processes by organizations (Ferreira, Fernandes, and Ferreira, 2019; Nicola and Setiawan, 2024; Wang, S., and Zhang, 2025).
2. To measure the effect of digitalization on innovation abilities and operational outcomes of firms, especially in the context of SMEs and startups (Rupeika-Apoga, Petrovska, and Bule, 2022; Mohammed, Shanmugam, Subramani, and Pal, 2024).
3. To explore how managerial and entrepreneurial leadership assists in supporting digital adoption and transformation (Aliyu Mohammed, 2023; Mohammed, 2023).
4. To test the mediating role of the organizational culture, digital leadership, and systemic factors on the association between digital adoption and business outcomes (Mollah et al., 2024; Chen et al., 2021).

5. To inform policy makers and managers in a practical and theoretical manner in order to use digital transformation to create sustainable competitive advantage (Phiri, 2020; Mohammed and Sundararajan, 2023).

1.5 Research Questions

In line with the aims of the research, the study will aim at answering the following questions:

1. What factors drive organizations to adopt digital technologies and processes?
2. What are the effects of digital transformation on the organizational capabilities in innovation and in general business performance?
3. What is the contribution of managerial and entrepreneurial leadership to successful digital adoption and transformation?
4. What is the mediating role of organizational culture, digital leadership and systemic factors in the relationship between digital adoption and performance outcomes?
5. How can firms leverage digital transformation strategically to achieve sustainable competitive advantage?

2.0 Literature Review

This part is a critical review of the literature available on the subject of digital transformation, innovation, and the performance of entrepreneurs. The review is structured around the conceptual, theoretical, and empirical frames, with the emphasis on the three main constructs of the present study that include Digital Innovation (IV1), Software Development Capability (IV2), and Entrepreneurial Performance (DV). The gaps in the literature and the opportunities of the further research are also identified in the section.

2.1 Conceptual Review

2.1.1 Digital Innovation (IV1)

The process of using digital technologies, including data analytics, automation, artificial intelligence, and digital platforms, to produce new products, services, and business models, is called digital innovation (Ferreira, Fernandes, and Ferreira, 2019; Nicola and Setiawan, 2024; Wang, S., and Zhang, 2025). Digital innovation has been one of the most important forces of organizational competitiveness, especially in the e-commerce, IT, and manufacturing industry (Mollah et al., 2024; Ji, Miao, Wan, and Lin, 2024).

Research shows that digital innovation is helping companies to improve customer experience, automate internal processes and respond quickly to environmental dynamism (Yadav and Pavlou, 2014; Nambisan, 2016; Phiri, 2020). Digital infrastructure, digital culture, and digital leadership as the facilitators of implementation of innovation are also discussed in the literature (Zhang, Xu, and Ma, 2023; Mollah, Pal, Amin, Rahaman, and Abdullah, 2024).

In more practical terms, digital innovation prompts entrepreneurial firms to explore new market opportunities, design strategies to compete with others, and attain sustainable growth (Mohammed, 2023; Aliyu Mohammed, 2023). Though these lessons are acquired, the literature shows that there is still no knowledge about how digital innovation can be converted into measurable performance in entrepreneurship, particularly in SMEs and startups that operate in resource-constrained environments (Rupeika-Apoga, Petrovska, and Bule, 2022; Wang, S., and Zhang, 2025).

2.1.2 Software Development Capability (IV2)

Software development capability refers to the ability of a company to create, develop, and implement software-based systems that facilitate its efficiency in operations, innovative products, and strategic decision-making (Mohammed, 2023; Mohammed, Jakada, and Lawal, 2023). High capability Software development Can facilitate the integration of new digital tools and the implementation of complex IT solutions and make organizations agile and resilient in the digital economy (Zhang, Xu, and Ma, 2023; Liu, Liu, and He, 2023).

A range of research papers state that the introduction of modern software programs leads to increased internal communication and knowledge exchange, as well as real-time decision-making that, in turn, contributes to entrepreneurial endeavors (Mohammed and Sundararajan, 2023; Rodrigues, Oliveira, and Rodrigues, 2023). IT investments and performance of a firm are also interconnected through the significance of software capability, especially in association with digital transformation strategies and top management backing (Rupeika-Apoga, Petrovska, and Bule, 2022; Zhang, Xu, and Ma, 2023).

The literature further emphasizes that the combined capacity of software development and

digital innovation initiatives enhances the power of the company to utilize the market opportunities, maintain the competitive edge, and attain the operational excellence (Mohammed, Shanmugam, Subramani, & Pal, 2024; Shanmugam Sundararajan, Rajkumar, Senthilkumar, Mohammed, and Prince Martin, 2024).

2.1.3 Entrepreneurial Performance (DV)

The performance of entrepreneurship (DV) is assessed through two items: 1) evaluating the personal characteristic of being an entrepreneur; 2) evaluating the performance of entrepreneurship using six-item scale scores.

The conceptualization of entrepreneurial performance is that it is the capacity of firms and entrepreneurs to reach business goals with the help of innovation, market responsiveness, financial growth, and operational efficiency (Ferreira, Fernandes, and Ferreira, 2019; Nicola and Setiawan, 2024). Digital technologies, strategic leadership, and human resource practices are part of the factors that affect performance outcomes (Aliyu Mohammed, 2023; Mohammed, 2023; Mohammed and Sundararajan, 2023).

Empirical evidence indicates that digital transformation and a high level of software development, as well as presence of a culture of innovation, are important factors enhancing the performance of entrepreneurship in all industries, including SMEs, IT companies, manufacturing, and services (Wang, S., and Zhang, 2025; Mollah et al., 2024; Chen et al., 2021). Digitalization has the capacity to improve financial performance, as well as operational efficiencies, knowledge transfer, and customer satisfaction (Phiri, 2020; Rupeika-Apoga, Petrovska, and Bule, 2022).

Moreover, according to the literature, the connection between digital innovation and the performance outcomes is mediated by the managerial attitude, digital leadership, and strategic human resource management, which reveals the relevance of the integrated approach to the entrepreneurial success (Mohammed, Jakada, and Lawal, 2023; Mohammed, Shanmugam, Subramani, and Pal, 2024; Sundararajan, Mohammed, and Lawal, 2023).

Nevertheless, the research on systemic and contextual determinants that drive entrepreneurial performance in developing economies is under-researched, so the given aspect is a significant area of new research (Aliyu Mohammed, 2023; Mohammed, 2023).

2.2 Theoretical Framework

The conceptual framework gives the theoretical support of understanding the relation between Digital Innovation (IV1), Software Development Capability (IV2), and Entrepreneurial Performance (DV). There are 3 theories used in the study, such as the Resource-Based View (RBV), Dynamic Capabilities Theory, and Entrepreneurial Orientation Theory. These models describe the contribution of digital change and software ability to entrepreneurial performance.

2.2.1 Resource-Based View (RBV)

Resource-Based View (RBV) assumes that the sustainable competitive advantage can and should be attained by firms that establish and utilize precious, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991). Regarding digital innovation, RBV focuses on the fact that IT infrastructure, the possibility of software development, and managerial skills are strategic resources that contribute to the performance of the firm (Zhang, Xu, and Ma, 2023; Rupeika-Apoga, Petrovska, and Bule, 2022).

RBV argues that the more digital and technological a firm is, the better placed it is to innovate and can leverage the new market opportunity as well as perform at a high entrepreneurial level (Mohammed, 2023; Aliyu Mohammed, 2023). Another point highlighted in the theory is that the strategic alignment of digital resources to the organizational goals is the key to the optimal utilization of innovation outcomes and preservation of the competitive edge (Mollah et al., 2024).

2.2.2 Dynamic Capabilities Theory

The Dynamic Capabilities Theory is another extension of RBV that concentrates on the ability of the firm to combine, build and restructure internal and external capabilities to respond to the rapidly changing environments (Teece, Pisano, and Shuen, 1997). The initiatives of digital transformation and software development capabilities can be considered as dynamic capabilities enabling firms to detect the opportunity and capture it as well as transform their processes to ensure competitiveness

(Ferreira, Fernandes, and Ferreira, 2019; Liu, Liu, and He, 2023).

The idea of dynamic capabilities is especially important in technology-intensive sectors, where the successes of entrepreneurs are defined by a constant stream of innovation, quick iterative response, and dynamic decision-making (Mohammed, Jakada, and Lawal, 2023; Shanmugam Sundararajan, Rajkumar, Senthilkumar, Mohammed, and Prince Martin, 2024). With the help of digital tools and agile software, companies become more flexible, responsive, and able to create value due to digital innovation (Wang, S., and Zhang, 2025; Mohammed, Shanmugam, Subramani, and Pal, 2024).

2.2.3 Entrepreneurial Orientation Theory

Entrepreneurial Orientation (EO) Theory focuses on the behavioural and the strategic characteristics of entrepreneurship such as innovativeness, proactiveness and risk-taking (Lumpkin and Dess, 1996). Companies characterized by a high level of entrepreneurial orientation will actively use digital innovation, embrace the power of progressive software development, and undertake strategic experimentation to enhance performance results (Nicola & Setiawan, 2024; Mohammed, 2023).

Another approach in which EO theory emphasizes the significance of leadership and managerial attitudes is the boosting of innovations and entrepreneurial performance (Aliyu Mohammed, 2023; Mohammed and Sundararajan, 2023). Digital technologies allow entrepreneurial-oriented firms to develop market differentiation, achieve the efficiency of operations, and sustain business growth in dynamic business environments (Ferreira, Fernandes, and Ferreira, 2019; Mollah et al., 2024).

2.2.4 Linkages between Theories, IVs, and DV

Extremely close connections exist between theories, IVs, and DV. The integration of RBV, Dynamic Capabilities, and EO creates a well-rounded approach to the realization that Digital Innovation (IV1) and Software Development Capability (IV2) can affect Entrepreneurial Performance (DV).

- RBV states that the companies that have the best digital resources and abilities have the basis of innovation and competitive strength (Zhang, Xu, and Ma, 2023; Mohammed, 2023).
- Dynamic Capabilities Theory refers to the process by which the firms change these resources according to the shifting market needs, which provides constant improvement and responsiveness (Liu, Liu, and He, 2023; Shanmugam Sundararajan, Rajkumar, Senthilkumar, Mohammed, and Prince Martin, 2024).
- The behavioural aspects are represented by EO Theory, which demonstrates that managerial proactiveness, risk-taking, and innovation orientation are the keys to effective implementation of digital and software capabilities to secure the higher level of entrepreneurial performance (Nicola & Setiawan, 2024; Aliyu Mohammed, 2023).

Collectively the theories support the idea of the conceptual model of this study Digital Innovation and Software Development Capability are independent variables, and Entrepreneurial Performance is the dependent variable. The theoretical framework therefore offers the justification behind hypothesizing that firms that have strong digital and software capabilities, driven by entrepreneurial orientation, have more chances of attaining sustainable competitive advantage and good business results.

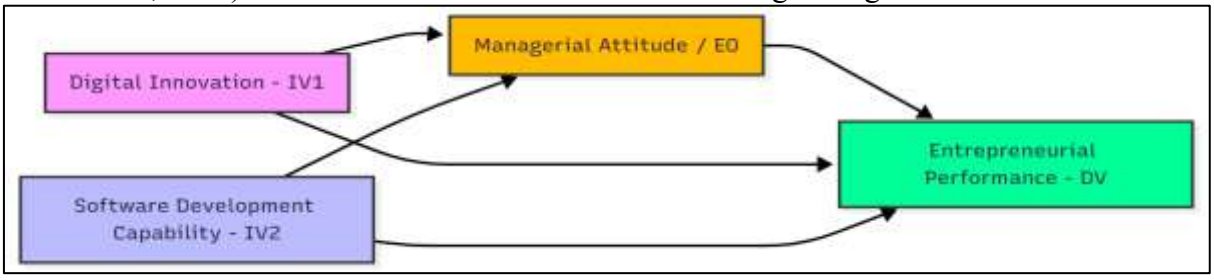

Figure 1: Conceptual Framework Showing the Influence of ICT Integration and Software Innovation on Entrepreneurial Performance

Source: *Author's conceptualization, 2025*

This figure illustrates the proposed conceptual framework for the study. The independent

variables are Digital Innovation (IV1) and Software Development Capability (IV2) and are assumed to have a direct and indirect impact on the performance of the entrepreneurship (DV). The Managerial Attitude / Entrepreneurial Orientation (EO) is a mediator variable, which mediates the impact of the independent variables on entrepreneurial performance. The arrows show how the relationships are likely to flow and which way they will have an influence.

2.3 Empirical Review

The existing empirical evidence underscores the importance of digital innovation and digital capabilities in increasing the entrepreneurial performance, especially among SMEs and technology-oriented companies. As shown by Zhe and Hamid (2021), the adoption of digital technology and digital capabilities has a considerable positive impact on the performance of small businesses, which are mediated by digital innovation. In the same vein, Khin and Ho (2019) highlight that the digital innovation is a critical mediator between digital capabilities and the overall performance of the firm.

Recent literature emphasizes the synergistic relationship between digital entrepreneurial opportunities, creation of knowledge and market-sensing abilities on the results of entrepreneurship in software SMEs as well (Zhang, Sherani, Riaz, Zia, Ali, and Liu, 2024). Shah et al. (2024) demonstrate that digital technology and innovation both contribute to better performance of a firm, especially in digital economies, and Redondo-Rodriguez, Perez-Bustamante Yabar, and Diaz-Garrido (2023) suggest that technological innovations positively impact the operation of digital entrepreneurship and economic performance, in general.

Digital implementation and digital HRM has also been discussed. Xie et al. (2024) discover that the digital platforms have a strong influence on the activities of innovation and entrepreneurship, whereas Yusuf et al. (2023) reveal that digital HRM with digital innovation may increase the performance of SMEs in Indonesia. Furthermore, Suhane (2024) emphasizes that digital innovation contributes to entrepreneurial performance among SMEs especially in enhancing efficiency in their operations and responsiveness to the market.

Other researches also indicate digital transformation and digital leadership as performance drivers in organizations. Mubarak et al. (2019) illustrate the beneficial impact of digital transformation on SME business performance, and Mollah et al. (2024) indicate that digital performance leads to sustainable financial performance with the support of the digital innovation. On the same note, Liu, Liu, and He (2023) conclude that digital ambidexterity influences the performance of businesses in a positive way, with a focus placed on the combination of exploratory and exploitative digital capabilities.

Aliyu Mohammed (2024) suggests reskilling and upskilling in IT companies can increase the performance of entrepreneurs, whereas Sundararajan, Mohammed, and Senthil Kumar (2022) demonstrate that agile performance management can increase the efficiency and innovation of IT companies. Mohammed, Shanmugam, Subramani, and Pal (2024) emphasize that strategic HR manages to mediate the connection between the entrepreneurial venture and sustainable growth, and this aspect proves the importance of considering technological, human, and managerial aspects.

2.4 Research Gap

Despite substantial empirical work, gaps remain:

- **Wholesome frameworks of IT SMEs:** The majority of studies treat the topics of digital innovation, digital capabilities, or entrepreneurial performance independently. Science has not developed much research that combines these aspects in IT and software SMEs in new economies such as Nigeria.
- **The HR and managerial impact on synergy:** Not many studies examine the joint effect of strategic HR management, managerial attitude, and digital innovation on the level of entrepreneurship (Mohammed, Shanmugam, Subramani, and Pal, 2024).
- **Empirical evidence in third world settings:** The majority of evidence is based on the developed economies, and there is a gap in the system of context-specific research on the perspectives of Nigerian SMEs (Aliyu Mohammed, 2024).
- **Dynamic capabilities and digital platforms:** Little is known about how the combination of digital platforms, digital ambidexterity and digital

leadership can lead an entrepreneur to success (Mollah et al., 2024; Liu, Liu, and He, 2023).

To fill these gaps, the present study combines the digital innovation, software development potential, digital HRM, attitude of managers, and agile management systems to investigate the synergy between these factors and the performance of the entrepreneurs in the IT SMEs in Nigeria.

2.5 Conceptual Model

The conceptual model assumes that Digital Innovation (IV1) and Software Development Capability (IV2) can affect Entrepreneurial Performance (DV), and mediate the relationship of these variables by managerial attitude and strategic HR practices. Agile systems of performance management also serve as augmenters of the digital capabilities effect on performance.

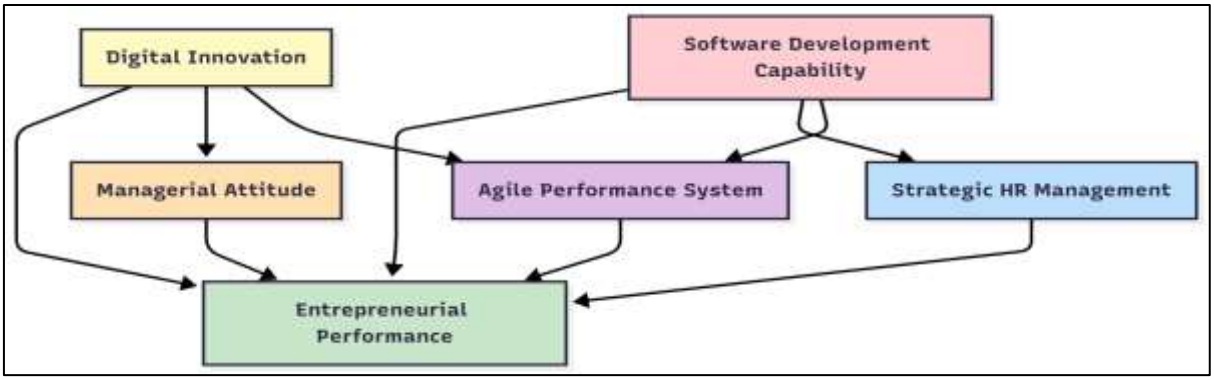

Figure 2: Conceptual Model

Source: Author's conceptualization, 2025

2.5.2 Tables Linking Variables

Independent Variable	Mediator / Moderator	Dependent Variable	Key References
Digital Innovation	Managerial Attitude / Agile Performance System	Entrepreneurial Performance	Zhe & Hamid (2021); Suhane (2024); Aliyu Mohammed (2024)
Software Development Capability	Strategic HR Management / Agile Performance System	Entrepreneurial Performance	Zhang et al. (2024); Mohammed, Shanmugam, Subramani, & Pal (2024); Sundararajan, Mohammed, & Senthil Kumar (2022)
Managerial Attitude	—	Entrepreneurial Performance	Mohammed, Jakada, & Lawal (2023)
Strategic HR Management	—	Entrepreneurial Performance {	Sundararajan, Mohammed, & Lawal (2023)
Agile Performance System	—	Entrepreneurial Performance	Sundararajan, Mohammed, & Senthil Kumar (2022)

Source: Author's Reviewed (2025)

3.0 Research Methodology

The research is structured in a way that a systematic research approach is implemented to test the hypothesis that Digital Innovation (IV1) and Software Development Capability (IV2) have an impact on Entrepreneurial Performance (DV) of IT SMEs in Nigeria. The methodology combines a conceptual method that is informed by the previous empirical literature so that it is strong in investigating direct, mediating and moderating relationships that are found in the conceptual model.

3.1 Research Design

There is a descriptive and explanatory research design. The descriptive part will enable to identify and measure current digital practices, managerial attitudes, and software development skills among IT SMEs, whereas the explanatory will determine the interdependence of the independent variables (IV1 and IV2), mediators (managerial attitude and strategic HR management), and the dependent variable (entrepreneurial performance).

This design is in line with the strategies employed by Zhe and Hamid (2021), Suhane (2024), and Aliyu Mohammed (2024), who utilized descriptive and explanatory frameworks to assess the effects of digital innovation on the outcomes of organizations in SMEs.

3.2 Data Sources and Collection

Considering the fact that the present research involves a conceptual and theory-driven methodology, the information will be collected solely through secondary sources, collected in scholarly and institutional repositories. This is not aimed at producing new primary data, instead, it aims at summarising existing results in building a logical theoretical framework between Digital Innovation (IV1) and Software Development Capability (IV2) and Entrepreneurial Performance (DV).

Nature of Data Sources

The study relies on:

- Digital innovation, software capability and entrepreneurship: peer-reviewed journal articles, conference proceedings, and books.
- Institutional and governmental publications on the topic of performance of SMEs, policy of innovation, and the adoption of digital in the emerging economies.
- Resource-Based View (RBV), Dynamic Capabilities Theory (DCT), and Entrepreneurial Orientation Theory (EOT) have already been explored conceptually and empirically in the digital setting (Ferreira, Fernandes, and Ferreira, 2019; Mollah et al., 2024; Yadav et al., 2024).

Scope of Literature Integration

The conceptual synthesis draws from interdisciplinary perspectives, integrating:

The conceptual synthesis is based on interdisciplinary standpoint, which combines:

- Management and technological innovation (Chen et al., 2021; Ji et al., 2024; Teng, Wu, and Yang, 2022);
- Entrepreneurship and leadership studies (Ongo Nkoa & Song, 2023; Mohammed, Jakada, and Lawal, 2023);
- Software engineering and digital capability models (Rupeika-Apoga, Petrovska, and Bule, 2022; Nicola and Setiawan, 2024);
- Performance measurement and management systems (Sundararajan, Mohammed, & Senthil Kumar, 2023; Mohammed, Shanmugam, Subramani, and Pal, 2024).

This incorporation makes the study analytical but not empirical, i.e. it attempts to find out the relationship, causative logic, and conceptual connections but not actual measurement or field testing.

Data Collection Process (Conceptual Level)

On a conceptual level, the process of data collection will entail:

- Literature mapping to determine patterns, theme, and variables that relate innovation, capability, and performance.
- Critical content analysis to contrast models and theoretical constructs put forward in previous studies.
- Synthesis of concepts with both theoretical and empirical understanding to come up with an overall explanation.

This method is consistent with already existing conceptual methodologies (Satalkina and Steiner, 2020; Rodrigues, Oliveira, and Rodrigues, 2023), making it rigorous and traceable of the sources.

3.3 Conceptual Approach

The approach that is applied to this paper is conceptual and integrative as it synthesizes the knowledge of the well-known theories and the available level of empirical research in order to create a single model explaining the impact of digital innovation and software development capability on the entrepreneurial performance.

1. Theoretical Orientation

The conceptual analysis is anchored on three complementary theoretical perspectives:

a. Resource-Based View (RBV)

In the RBV, the competitive advantage is based on the unique, valuable and inimitable resources possessed by the firm (Zhang et al., 2024; Aliyu Mohammed, 2024). In this context, software development capability will be an asset of strategies that will improve operational efficiency and innovation. The literature, e.g., Ferreira,

Fernandes, and Ferreira (2019) and Nicola and Setiawan (2024), confirms that digital resources and IT capabilities play an important role in the success of the entrepreneurship, as it enhances productivity and the ability to innovate.

b. Dynamic Capabilities Theory (DCT)

DCT builds on the RBV with a focus on how an organization can reorganize and adjust its resources to cope with changing environments (Mollah et al., 2024; Suhane, 2024). The agile management systems and managerial attitude are dynamic capabilities in this research that assist firms in adapting to technological disruptions. Similar to Chen et al. (2021) and Yadav et al. (2024), such flexibility ensures the long-term performance even in the situation when the market conditions are unsure.

c. Entrepreneurial Orientation Theory (EOT)

EOT focuses on the most important aspects of entrepreneurship: innovation and proactivity, and taking risks (Shah et al., 2024; Mohammed, Shanmugam, Subramani, and Pal, 2024). Through this theoretical construct, EOT defines the way in which companies can make rational use of digital opportunities in the achievement of high performance. Entrepreneurial orientation accordingly mediates the relationship whereby the technological innovation and organizational growth are included (Phiri, 2020; Ongo Nkoa and Song, 2023).

2. Conceptual Model Development

The conceptual model integrates the three theories:

- The perception of digital innovation as the driver of change.
- Taking the capability of software development as the strategic resource facilitating the digital effectiveness.
- The behavioural force that can be attributed to the conversion of resource utilization into measurable performance is entrepreneurial orientation.

This triangulation is a multi-dimensional point of view on how the company can achieve sustainable performance due to digital investments, which resemble the propositions of Ji et al. (2024), Porfirio et al. (2024), and Mohammed and Sundararajan (2023).

3. Methodological Justification

The following explanations can be made of this theoretical methodology:

1. It allows the cross-disciplinary integration of technology management, entrepreneurship, and strategy research (Satalkina & Steiner, 2020; Hakim et al., 2022).
2. It enables the generalization of theory, and is not restricted to the empirical sampling.
3. It is used in the creation of a theory, which is consistent with the conceptual precedents of digital transformation and performance (Rodrigues, Oliveira, and Rodrigues, 2023; Teng, Wu, and Yang, 2022).

By so doing, the research produces propositional hypotheses to test and a conceptual model that can inform future empirical studies and policy interventions to help reinforce the digital entrepreneurship ecosystem, especially in developing entities such as Nigeria.

4.0 Findings of the Study

4.1 Summary of Key Insights from Literature

In the interactions between technology, leadership, and strategic capability that determine the outcomes of firms especially when it comes to small and medium-sized enterprises (SMEs) in developing economies, it can be found that a comprehensive conceptual synthesis of recent literature on digital transformation, innovation, and entrepreneurial performance can be discussed as being multi-dimensional.

1. Drivers of Digital Adoption

The internal enablers and external environmental enablers have been identified as the key determinants in the adoption of digital technologies in SMEs. Within the organization, technological preparedness, managerial orientation, and entrepreneurial orientation play a key role in the process of digitalization transition (Ferreira, Fernandes, and Ferreira, 2019; Nicola and Setiawan, 2024; Mohammed, 2023). Companies that have active and digitally savvy managers are more likely to invest in the infrastructure, upskilling and new tools that help them to be competitive and more efficient.

On the outside, government assistance, policies, and market forces are significant factors in the digital transformation of SMEs. An example is regulatory support and digital inclusion programs, which the firms gain better access to resources and digital ecosystems (Chen et al., 2021; Phiri,

2020). In developing economies such as Nigeria, institutional interventions, such as the ICT development strategies have played a critical role in closing down the digital divide as well as enhancing inclusive entrepreneurship.

2. Impact on Innovation Capabilities and Performance

Digital transformation has a direct impact on the ability of a firm to be innovative to allow more automation of processes, further customization of products, and responsive business modelling. The research confirms that data analytics and new technologies make digitally transformed SMEs more agile, resilient, and performance-oriented (Rupeika-Apoga, Petrovska, and Bule, 2022; Wang and Zhang, 2025; Mohammed, Shanmugam, Subramani, and Pal, 2024).

Moreover, the mediating factors are technological innovation, the development of digital skills, and strategic human resource management to boost sustainable business performance (Hakim, Laelawati, and Mardian, 2022). The interdependence between the human and technological capabilities highlights the imperative to integrate the innovation strategy with the workforce development which is backed by the empirical evidence in developed and developing economies.

3. Role of Managerial and Entrepreneurial Leadership

Leadership has a core contribution towards digital transformation and performance improvement. The conceptual and empirical research proves that the attitude of managers, entrepreneurial mindset, and transformational leadership practices play a significant role in the effective implementation of digital programs (Aliyu Mohammed, 2023; Mohammed, Jakada, and Lawal, 2023). Leaders act as change agents, establishing an innovation culture within the firm, promoting teamwork, and setting the strategic path of the firm in digital transformations (Sundararajan, Mohammed, and Senthil Kumar, 2023).

Entrepreneurial leadership improves risk-taking propensity, strategic agility, and proactiveness enabling firms to take advantage of the new prospect in the changing technological environment. The culture of innovation spearheaded by the leaders creates the foundation of long-term growth of performance and sustainable competitive advantage.

4. Mediating Effects of Organizational Culture and Systemic Factors

Organizational culture mediates the relationship between the digital adoption and the performance of the entrepreneurship through digital leadership and systemic enablers (such as IT infrastructure and knowledge-sharing mechanisms). Higher rates of innovation and faster digitalization are also more likely to be observed in companies that develop collegial cultures based on their knowledge (Mollah et al., 2024; Chen et al., 2021; Ongo Nkoa and Song, 2023).

Moreover, the innovation and productivity are sustained through the knowledge management practices such as the organization learning and continuous improvement. The interaction between the organizational learning effect that the digital transformation has and the effect of the digital transformation is based on the fact that highly adaptive organizations to technological disruption have good knowledge networks and are digitally literate (Yadav et al., 2024; Jan et al., 2025).

5. Strategic Value of Digital Transformation

Modern entrepreneurship that is strategically implemented has made digital technologies one of the primary separating factors of performance. Those companies that effectively apply digital transformation can be better resistant to the market, more efficient in their activities, and competitive (Phiri, 2020; Mohammed and Sundararajan, 2023; Teng, Wu, and Yang, 2022). Digitalization does not only ease the internal processes, but also enables companies to transform their business models, increase the market reach, and manipulate the data to engage with their customers in new and data-led ways.

Empirical and conceptual data bring an individual to the conclusion that digital transformation enhances strategic competitiveness due to its increased decision-making, cost-saving, and faster innovation (Ferreira, Fernandes, and Ferreira, 2019; Nicola and Setiawan, 2024). Digital transformation to SMEs and in this context, Africa in particular is not a simple operational improvement, but a survival and growth necessity in the ever-changing global businesses.

4.2 Implications for Entrepreneurial Performance

There is conceptual synthesis that the digital innovation and the capability of creating software applications are co-determiners of the degree of entrepreneurial performance to the extent of either influencing each other through technology, leadership, and strategy.

Implication	Description	Key Mechanism
1. Enhanced Operational Efficiency	Digitally enabled SMEs achieve significant gains in process automation, resource optimization, and real-time performance monitoring, all of which contribute to enhanced operational efficiency.	Process automation, resource optimization, real-time monitoring
2. Innovation-Driven Growth	Continuous innovation is triggered by digital transformation, and it helps in new product development, quick adaptation to the market, and flexibility of the business model. Companies that have incorporated digital innovation in their business models acquire greater innovation speed and increased market sensitivity.	Continuous innovation, market responsiveness, product & business model flexibility
3. Leadership as a Performance Lever	Leadership takes the form of a key driver in the conversion of digital investments into performance results. Inspirational leaders create employee engagement, develop a digital confidence, and coordinate strategic efforts with corporate objectives.	Visionary leadership, employee engagement, strategic alignment
4. Mediating Organizational Structures	The connection between digital adoption and firm outcome goes through organizational culture and human resource systems. The digital learning programs, strategic HRM practices, and innovation-oriented structures improve internal coherence.	HRM practices, digital learning, agile and collaborative structures
5. Strategic Competitiveness	Digital transformation helps SMEs to gain a competitive edge, enhance a market position, and experience sustainable growth. The fit between digital investment and entrepreneurial orientation helps companies to quickly adapt, seize opportunities, and create a strong business ecosystem.	Competitive advantage, strategic alignment, opportunity exploitation

Source: Reviewed by the authors, (222

The conceptual results support the idea that the forces of the digital innovation, software capability and entrepreneurial leadership are interactive and that the unanimity of the forces defines the entrepreneurial performance and sustainability in the digital environment.

5.0 Recommendations of the Study

According to the synthesis of the literature, conceptual and theoretical links, the study proposes several practical, policy and research-based recommendations. The recommendations will assist the SMEs, policy makers and researchers to use digital transformation as a source of entrepreneurial performance and sustainable competitiveness.

5.1 Practical Recommendations

1. Adopt Integrated Digital Strategies

The SMEs will be motivated to adopt the digital transformation strategies which are incorporated to align the technology tools, the human capital in addition to the organizational systems. Such integration will ensure that the process of digitalization is not confined to the technology purchase only but includes the redesigning of processes, the adoption of culture and improvement of performance. Managerial skills and the use of digital tools and the agile firms would allow them to produce optimal output in

terms of innovation and operational efficiency (Ferreira, Fernandes, and Ferreira, 2019; Nicola and Setiawan, 2024).

The holistic strategy will allow the SMEs to address the constraints of resources and strategic objectives, in such a way that the process of digital adoption becomes embedded in the entrepreneurial agility, interaction with the customer and value creation over time.

2. Strengthen Leadership Capabilities

Digital transformation is based on effective managerial and entrepreneurial leadership. Companies ought to invest in the leadership development programs that can prepare managers with the ability to become digitally literate, strategically oriented, and make decisions that are innovation-driven (Aliyu Mohammed, 2023; Mohammed, Jakada, and Lawal, 2023).

Effective leadership does not only facilitate the process of digital adoption, but also creates the culture of life-long learning, taking risks, and teamwork, which are key qualities during the web of disruption. As leaders in entrepreneurship, they need to be drivers of change, and the digital projects should promote organizational objectives in the long term and unique results in performance.

3. Invest in Skills Development

The key driver of digital transformation is still human capital. Reskilling and upskilling programs to improve the digital, analytical, and problem-solving skills of employees should be prioritized by the SMEs and startups (Aliyu Mohammed, 2024; Hakim, Laelawati, and Mardian, 2022).

Organized digital competence training programs, i.e. software development, data analytics and digital marketing skills, can greatly enhance workforce flexibility. Digital skill system investment also helps in resolving the disparity between technology use and organizational performance, and thus makes innovation a human process, instead of a technological one.

4. Leverage Agile and Knowledge-Based Systems

To promote cooperation and responsiveness, organizations ought to integrate the performance management systems and knowledge sharing models as part of their operational model. Agile practices are able to help the SMEs react fast to the changes on the market, and knowledge-sharing platforms can make cross-functional learning and diffusion of innovations a possibility (Sundararajan, Mohammed, and Senthil Kumar, 2023; Mollah et al., 2024). Not only does a knowledge-based and agile organization improve the efficiency of the operations, but also it fosters the culture of learning that can facilitate the long-term entrepreneurial development. Such systems also enable real-time decision making, ease of communication and lessening of obstacles to the implementation of innovations.

5.2 Policy Implications

1. Government Incentives and Support

Governments are strategic in facilitating digital transformation in SME. The policymakers ought to come up with financial incentives, regulatory systems, and support systems infrastructures that reduce barriers to entry into digital adoption (Chen et al., 2021; Phiri, 2020). Such support can be in the form of tax incentives to invest in technology, digitally-subsidized training programs and access to innovation hubs or accelerators. Innovation diffusion can also be encouraged by fostering cooperation between SMEs, research bodies, and governmental bodies through the promotion of collaboration between them.

2. Frameworks for Digital Entrepreneurship

The national and regional governments ought to develop all-inclusive digital entrepreneurship systems which promote formation and growth of digital enterprises. Such frameworks are expected to focus on networks of innovations, platforms of knowledge exchange, and the development of digital infrastructure, which allows SMEs to gain access to markets, investors, and global value chains (Jan et al., 2025; Ongo Nkoa and Song, 2023). Digitized ecosystems are also institutionalized to encourage entrepreneurial inclusivity, which guarantees that a startup entrepreneur, as well as the old-established business, becomes a beneficiary of technology-infused opportunities.

3. Sustainable Digital Practices

All strategies of digital transformation should incorporate sustainability. A responsible approach to digital initiatives means that policymakers and business leaders need to consider environmental, social, and governance (ESG) considerations in a

digital initiative (Yadav et al., 2024; Lawal et al., 2023).

Green digitalization: through green supply chains, energy-saving technologies, and green waste management, SMEs can bring moderation between profitability and environmental responsibility. With such a strategy, it implies that the digital transformation does not contradict on the broader global sustainability agenda, such as the UN Sustainable Development Goals (SDGs).

5.3 Recommendations for Future Research

1. Longitudinal Studies

The research studies proposed in the future must be longitudinal in nature since the changes related to digital transformation are dynamic and thus to comprehend the variation of effects of digital adoption, innovation, and managerial leadership across the years. This would provide more insight into the causal relationship between the digital transformation and the performance of the entrepreneurs especially in the volatile markets.

2. Cross-Country Comparative Studies

It is increasingly clear that comparative studies are required between emerging and developed economies in order to determine contextual differences that affect the digital transformation. This type of research is able to reveal the moderating effect of institutional support, cultural values and economic structures on the digital-performance relationship. Best practices should also be made in comparison studies that can be localized to African and other developing settings.

3. Exploration of Emerging Technologies

Conceptual and empirical research in the future ought to explore the impact of new technologies including Artificial Intelligence (AI), Blockchain, Internet of Things (IoT), and Cloud Computing on the performance of innovation and strategic competitiveness in SME. The barriers and capability requirements of these technologies to adoption will help to improve theoretical models of digital entrepreneurship.

4. Gender-Focused Research

The issue of gender is a poorly studied aspect in the field of digital transformation. The next generation research ought to be performed on the special challenges and opportunities of women-owned digital firms, such as access to finance, technology, and entrepreneurship networks (Ongo Nkoa and Song, 2023). Such studies would be useful in establishing a more encompassing perception of how digital innovation can contribute to gender equity, economic and social empowerment in entrepreneurial ecosystems.

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