GAS Journal of Economics and Business Management (GASJEBM)

Volume 2 | Issue 12, 2025 Homepage: https://gaspublishers.com/gasjebm-home/ ISSN: 3048-782X

Influence of Technological Capability and Innovation Culture on Startup Profitability

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Received: *25.10.2025* | ***Accepted:*** *22.11.2025* | ***Published:*** *05.12.2025*

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DOI: *10.5281/zenodo.17828369*

Abstract **Original Research Article**

This theoretical paper shall explore the impact of technological capability and culture of innovation on the profitability of start-ups based on the synthesis of the concepts of Resource-Based View (RBV), Dynamic Capability Theory (DCT), and the Innovation Diffusion Theory (IDT). The hypothesis of the study is that technological capability; which is technology infrastructure, knowledge management and competence in R and D is a strategic base to competitive advantage. Nonetheless, the achievement of profitability is highly reliant on the mediating effect of innovation culture, creating creativity, flexibility, and continuous improvement. The conceptual framework of the study is built through a quantitative synthesis of secondary data sources based on peer-reviewed journals and academic literature, as a multidimensional conceptual framework between internal capabilities and cultural dynamics and the financial performance outcomes. The findings emphasize that technological capability alone is insufficient for sustained profitability without an innovation-oriented environment that supports experimentation and knowledge sharing. The study recommends that startups enhance their technological infrastructure, strengthen R&D efforts, and institutionalize innovation culture as part of their strategic growth agenda. Policymakers also are urged to offer enabling innovation ecosystems by offering incentives to invest and capacity-building programmes. The suggested conceptual framework offers a basis upon which there will be empirical research in future and theory development within the field of entrepreneurship, innovation management, and strategic capability development.

Keywords: Technological Capability, Innovation Culture, Startup Profitability, Resource-Based View, Dynamic Capability Theory, Innovation Diffusion Theory.

1.0 Introduction to the Study

1.1 Background of the Study

Startups have become a crucial source of innovation, employment and technology in the modern global economy. The advent of technology-driven enterprises has transformed the conventional business model and used digital platforms, artificial intelligence and data-driven innovation to become more competitive and profitable. The companies are adopting technological abilities worldwide, the capability to acquire, internalize and utilize knowledge in order to continue with the innovative output and stay at the strategic edge (Zahra and George, 2002; Wang and Ahmed, 2007). Ahn, Kim,

and Lee (2022) note that the intensity of technological innovation and achievement of technology-based startups depend on factors such as technology capability and entrepreneurship. On the same note, Tidd and Bessant (2018) underline that the process of innovation management should be based on the balanced incorporation of all technological, organizational, and market-oriented changes as the cornerstone of sustainable growth. As it has been emphasized by the modern innovation paradigm, digital transformation and adaptable management systems allow startups to adjust to the changing market as well as increase the profitability potential (Aliyu, 2023, May 11; Prajoko and Ahmed, 2006). In various regions especially in the emerging economies, the ability of the startups to innovate is determined by the synergy of technological development of innovations and cultural enabler of innovations. According to Nonaka and Takeuchi (1995), knowledge creation and sharing in organizations are the basis of a continual innovation and long-term competitiveness. In this respect, the international approaches to human resource strategies and innovation management emphasize that companies should develop flexible cultures that can cause knowledge-based innovation and creativity (Aliyu, 2023). Moreover, technological flexibility, once being integrated into an innovation-driven culture, will enable startups to counter the possibility of resource limitation and compete successfully with established companies. Such interaction between innovation culture and technological ability has received growing academic interest as one of the sources of entrepreneurial success in the digital age (Prajogo and Ahmed, 2006; Ahn et al., 2022).

The African context is no exception as the diffusion of information technologies and emergence of digital entrepreneurship have played a key role in transformation of the entrepreneurship ecosystems. According to new findings, the use of digital technologies and the innovation-driven practices positively affect the performance of firms and contribute to the inclusive economic growth (Abubakre, Zhou, and Zhou, 2022). Nevertheless, there exist challenges in the form of poor technological infrastructure, low absorption capacity and poor culture of innovation relative to those in other parts of the world (Wang and Ahmed, 2007). This implies that the entrepreneurial environment in the continent is growing at an impressive rate, but the entire potential of technology-based profitability is limited by both structural and institutional constraints. As a result, the intensification of technological power and innovation culture is now a strategic requirement of the sustainability and profitability of African startups. Startups have become the driving force of economic diversification and employment of youths in West Africa and especially in Nigeria. However, there are numerous Nigerian startups that find it hard to reach the break-even point because of poor systems of innovation, insufficient investment in R&D, and lack of proper knowledge transfer systems (Aliyu, 2023; Aliyu, 2023, May 11). According to Aliyu (2023), the nature of global trade and technological shocks has restructured the competencies and strategies that are essential in a competitive market in the emergent markets. The emerging digital economy in Nigeria is also a chance that startups can exploit through agile management and technological adaptation to address the local challenges and improve their performance. As such, the impact of technological capability and innovation culture on the profitability of startups is an essential insight that can be used to create strong and competitive entrepreneurial ecosystems that can sustain in the dynamic global innovation environment.

1.2 Problem Statement

Although the focus on the digital transformation and entrepreneurship intensifies, the question of how the technological capability and the culture of innovation as a whole impact the profitability of startups is rather ambiguous. The current literature has tended to focus on these constructs independently of each other as opposed to interdependent elements which collectively dictate financial success and sustainability. Although the idea of technology adoption is generally accepted as a key facilitator of competitiveness, there are discrepancies in the degree to which technological change can be converted into the realization of quantifiable profitability results in various contexts

and industries (Zhou and Li, 2012; Aliyu, 2023). Further, there is an unclear conceptual gap in the context of mediating or moderating aspect of the innovation culture in this relationship. Despite the presence of technology in firms, cultural tolerance of creativity, experimentation and knowledge exchange can also determine their ability to use them to innovate and perform (Schumpeter, 1934; Teece, 2007). The literature is inconclusive on the fact that innovation-oriented cultures enhance or limit the profitability effects of technological capability, particularly in the context of startups in which resources constraints and uncertainty in the market are significant (Arunachalam et al., 2018; Carbó-Valverde et al., 2022).

Moreover, the high rate of digitalization and implementation of data-based tools in management has changed the manner in which new businesses compete and innovate. Nevertheless, there is still not empirical clarity to determine the contribution of such digital strategies to profitability in the dynamic conditions of emerging markets (Aliyu, 2023; Aliyu, 2024). Such discrepancy dictates a more profound conceptual investigation to determine the interaction of technological capabilities and the organizational culture to determine sustainable entrepreneurial performance. Thus, the proposed study attempts to fill in these conceptual gaps by synthesizing the contributions of dynamic capability theory, innovation management and entrepreneurship literature to come up with a holistic approach to the relationship between technological capability and innovation culture in increasing the profitability of startups.

1.3 Significance of the Study

The study is useful in regard to academic theory and managerial practice as it provides a comprehensive conceptual understanding of the role of technological capability and innovation culture in conjunction in the start-up profitability. The paper will contribute to the theoretical knowledge in the understanding of how startups may exploit internal resources, adaptive processes, and innovative behaviors to excel in dynamic and uncertain settings basing on the Resource-Based View (RBV), Dynamic Capability Theory (DCT), and Innovation Diffusion Theory (IDT) (El Hanchi and Kerzazi, 2020; Lawson and Samson, 2001; Li and Liu, 2014). The study fills any gaps in the current body of concepts by integrating the theoretical approaches through the multidimensional concept of technological capability and the interactive aspect of innovation culture in altering resources into competitive advantage. Under the managerial viewpoint, the research provides a viable insight to startup founders, innovation managers, and strategic leaders. In case of the interdependence of cultural flexibility and technological investments, managers would find it easier to align technological projects and the creative process in order to make the market more responsive and profitable (Goncalves et al., 2020; Aliyu, Jakada, and Lawal, 2023). These findings demonstrate the importance of agile leadership, effective re-use of resources, and the pertinent culture which enables continuous learning and innovation (Jun, Yi, and Amenuvor, 2024).

On policy, the study provides a set of guidelines of how governmental agencies, entrepreneurial development programs, and incubators should form supporting structures to positively influence the need to raise the levels of technological preparedness and innovativeness-driven behavior of startups. The institutional support can be strengthened to help emerging startups to grow sustainably and other resiliently in a competitive market by increasing institutional support in adopting technology, investing in innovation training, and creating an experimental spirit (Aliyu, Shanmugam, Subramani, and Pal, 2024). This type of understanding can be used by policymakers to develop the interventions that will be able to catalyze innovation systems and promote digital capabilities and expand access to entrepreneurial resources, in particular on the developing economies. Overall, the paper presents a moderately balanced contribution to the field of study on the theoretical, practical, and policy levels as it develops a conceptual framework through which internal technological capability, the culture of innovation, and the results of profitability can be correlated with each other and, therefore, contribute to the existing discourse in the area of entrepreneurship, innovation management, and organizational performance.

1.4 Research Objectives

The main objective of this conceptual study is to examine the influence of technological capability and innovation culture on startup profitability. Specifically, the study seeks to:

1. Assess how different dimensions of technological capability (such as technological infrastructure, knowledge management, and R&D competence) enhance startup profitability.

2. Examine the role of innovation culture in promoting creative problem-solving, adaptability, and competitive performance among startups.

3. Explore the mediating effect of innovation culture on the relationship between technological capability and startup profitability.

4. Develop a comprehensive conceptual model integrating technological capability, innovation culture, and startup profitability within the framework of RBV, DCT, and IDT.

1.5 Research Questions

To achieve the objectives above, the study is guided by the following research questions:

1. How do the various dimensions of technological capability contribute to startup profitability?
2. In what ways does innovation culture foster creativity and enhance performance outcomes in startups?
3. Does innovation culture mediate the relationship between technological capability and startup profitability?
4. What conceptual model best explains the interaction between technological capability, innovation culture, and startup profitability?

2.0 Literature Review

2.1 Conceptual Framework

This part constitutes the brain of the paper, as it gives a detailed synthesis of the major constructs of technological capability and innovation culture and how they lead to profitability of startups. It confirms the multidimensional character of independent variable and the mediatory position of the innovation culture and ties them into a rational conceptual perception based on the Resource-Based View (RBV), Dynamic Capability Theory (DCT), and the Innovation Diffusion Theory (IDT).

2.1.1 Concept of Technological Capability

Technological capability is the capability of a firm to utilize and control technological resources in the creation, production, and distribution of products and services that are competitive (Salisu and Abu Bakar, 2020). It goes beyond the technical aspect of owning technology to entail skills, learning curves and the ability to absorb which makes organizations be able to turn technology into business value. The capabilities are considered strategic resources of the Resource-Based View (RBV) as outlined by Barney (1991) to be the basis of sustainable competitive advantage. With time, researchers such as Calantone, Cavusgil and Zhao (2002) have highlighted that companies that have high technological capability are more innovative and responsive to change in the environment.

Dimensions of Technological Capability

a. Research and Development (R&D) Capability: R&D capability is an indicator that refers to the ability of a firm to produce new knowledge and transform it into marketable innovations. It forms the foundation of technological improvement and plays a crucial role in the improvement of innovation performance and profitability, especially in startups that operate with resource limitations (Lawal, Abdulsalam, Mohammed, and Sundararajan, 2023).

b. Absorptive Capacity and Technological Learning: Absorptive capacity to refer to the capacity of a firm to gain, absorb and utilise external knowledge is essential in converting external technological changes into internal growth opportunities (Calantone et al., 2002). Salisu and Abu Bakar (2020) also evidence that technology learning promotes relations among firms and enhances the result of innovation.

c. Digital and ICT Capability: With the digital transformation, the use of ICT tools has become a

key to the operational efficiency, decision-making based on data, and the spread of innovation (Mohammed and Sundararajan, 2023). Digital ability enables startups to increase operations and agility in markets that change quickly (Shanmugam, Rajkumar, Senthilkumar, Mohammed, and Martin, 2024).

d. Innovation and Product Development Capability: The dimension focuses on the capability of a firm to apply technological knowledge in the creation of new products and processes. Innovation and R&D go hand in hand: effective R&D systems create an experimental and idea-generating culture that leads to successful products (Alegre & Chiva, 2013).

e. Infrastructure and Technological Resource Base: A sound technological infrastructure, i.e. digital tools, equipment and technical knowledge, is the physical and intellectual backbone of innovation. As Mohammed and Sundararajan (2023) emphasize, companies that use smart technologies and digital resources will be more efficient and become more adaptable in their strategies.

Startups are quite dynamic and competitive environments in which the only way to survive is to innovate and react to the turbulence in the technology. Mohammed, Sundararajan, and Lawal (2022) have argued that technological capability allows startups to maximize the limited resources and attain high levels of performance results. Such capabilities can not only bring operational efficiency but also strategic benefit in the long-term perspective to startups due to the ability to be agile, creative, and responsive to market demands (Kumar, Mohammed, Raj, and Sundaravadivazhagan, 2024).

2.1.2 Concept of Innovation Culture

The culture of innovation entails the shared values, beliefs, and behavioral guidelines that encourage creativity, experimentation, and change-friendlyness. It indicates the willingness of an organization to take risk and turn ideas into a commercial innovation (Goncalves, Bergquist, Bunk, and Alangle, 2020).

Elements of Innovation Culture

Some of the important elements of innovation culture are, common creative values, leadership support, learning orientation and collaborative climate. Knowledge sharing becomes possible in a favorable environment, and leaders can impact significantly on the strengthening of trust and creative freedom (Alegre and Chiva, 2013).

i. Shared Values and Openness to Change: The members of the organization should be in harmony with each other with curiosity and experimentation to facilitate the innovation process (Mohammed and Sundararajan, 2023).

ii. Leadership Support and Learning Climate: Leaders who facilitate learning and withstand danger establish psychological safety that spurs creativeness (Mohammed and Sundararajan, 2023).

Innovation Culture in Startup Contexts

The level of adaptability, learning, and experimentation in the uncertainty context is defined by innovation culture in the case of startups. Mohammed and Sundararajan (2023) highlighted the fact that startups have a culture of agility, inter-functional cooperation, and constant learning in order to grow through innovation.

Innovation Culture as a Mediator

Innovation culture, acts as an intermediary between technological capability and performance at start-up because it converts technical resources into creative outputs and commercial outcomes. The mediating mechanism is consistent with the Dynamic Capability Theory (DCT) which states that companies should be able to integrate, develop, and restructure internal and external competences to the best of their performance (Lawson and Samson, 2001; Li and Liu, 2014). Through innovation culture, the communication barrier, learning, and flexibility can enhance the distance between the acquisition of the technology and turning it into profitability (Mohammed, & Sundararajan, 2023).

2.1.3 Concept of Startup Profitability

Startup profitability refers to the degree to which a new business turns revenues into net

financial gain and is, therefore, able to sustain itself, finance growth, and offer returns to stakeholders. Profitability is the key indicator of the survival and scaling up of startups in conceptual and managerial terms as it measures the short term viability and long term business success as each startup moves out of experimentation to commercially viable business operations (Barney, 1991; Zahra and George, 2002). A combination of determinants that are interdependent determines profitability in startups, regardless of operational efficiency, intensity and effectiveness of innovations, scalability of business models, and market adaptability. The efficiency of operations saves money and increases profitability; innovation (product and process) builds differentiation and pricing power; scalability allows taking advantage of fixed costs and increasing revenues; and market flexibility allows firms to address demand changes and technological disruption (Arunachalam et al., 2018; Salisu and Abu Bakar, 2020; Jun, Yi, and Amenuvor, 2024).

Startups in technology industries have unique routes to profitability: they tend to have greater initial investments in R&D and digital infrastructure, they tend to become technologically obsolete faster, and they are leveraged by network effects and scale of platform to generate value. Such companies can focus on short-term profitability to gain market share and innovation-led expansion, and timing of monetization and coordination of capabilities becomes vital (Ahn, Kim, and Lee, 2022; Kumar et al., 2024). The lack of access to finance, the ineffectiveness of R&D ecosystems, and a skills shortage are often considered constraints prevalent in developing settings and contribute to the postponement of break-even and profitability (Mohammed & Sundararajan, 2023). Ideally, technological capability provides the physical and intellectual resources (R&D, absorptive capacity, ICT, product development, infrastructure) that helps startups to innovate. The culture of innovation is the one that converts these resources into the constant generation of ideas, experimentation and commercialization. The more effective technological capability can be entrenched in an enabling culture of innovation, the better placed startups will be to transform innovation into offerings that can generate profit in the market, business operational efficiencies and scalable business models that are all drivers of unidimensional profitability. Therefore, profitability is perceived as a result of the resource endowments, as well as the cultural processes, which transform such resources into economic value (Zahra and George, 2002; Calantone, Cavusgil, and Zhao, 2002; Salisu and Abu Bakar, 2020).

2.1.4 Conceptual Interrelationships

The core conceptual pathway proposed in this paper is:

Technological Capability → Innovation Culture → Startup Profitability

This pathway assumes that technological capability is a multidimensional independent construct whose impact on profitability is mediated by innovation culture. The sources of value creation potential are technological resources (R&D, absorptive capacity, ICT, product development, infrastructure); innovation culture mobilizes the potential value creation by facilitating the sharing of knowledge, taking risks and commercialization and subsequently yield profitability. Since the concept of technological capability is multidimensional, the sub-dimension can potentially have both a direct and an indirect effect on profitability. Nevertheless in this conceptualization the main effect goes through innovation culture i.e. when technological investments are made, the culture of the organization encourages experimentation, learning and quick adoption of new knowledge this leads to higher profitability (Calantone et al., 2002; Zahra and George, 2002; Lawson and Samson, 2001). The net economic result of these numerous capability pathways is thus integrated into the unidimensional DV (profitability) after mediation by culture.

2.2 Theoretical Framework

The paper is based on three complementary theoretical frameworks, including the Resource-Based View (RBV), Dynamic Capability Theory (DCT), and the Innovation Diffusion Theory (IDT), so as to offer a multi-layered perspective of the

relationship between technological capability and innovation culture as independent variables and startup profitability as a dependent variable. All these theories bring together the internal resource endowment, the adaptive capacity and the innovation adoption behavior of the firm in a harmonious conceptual frame.

2.2.1 Resource-Based View (RBV) Theory

Resource-Based View (RBV) assumes that those firms attain and maintain high performance through development and exploitation of resources which are not substitutable, non-imitable, inimitable and valuable (VRIN) (Barney, 1991). These resources are tangible or intangible resources like technological know-how, human capital that is skilled, intellectual property, and organizational culture. In this context, technological capability is one of the vital strategic assets which includes digital competence, product innovation capability, absorptive capacity and R&D capacity (Cohen and Levinthal, 1990; Tang et al., 2020). When these abilities are properly pooled together with other complementary resources, they yield competitive advantages that would translate to enhanced profitability.

Moreover, the culture of innovation, manifested in the common values that encourage innovation, experimentation, and the exchange of knowledge is another strategic asset that improves the productivity of the technological resources. The integrated culture of innovation helps to convert technological investments to profitable innovations (Crossan and Apaydin, 2010). According to the RBV view, therefore, the profitability of startups is born when the technological and cultural resources are used synergistically to generate differentiated capabilities that are difficult to imitate by the competitors.

2.2.2 Dynamic Capability Theory (DCT)

The RBV is characterized as the Dynamic Capability Theory (DCT) which focuses on the capability of the firm to perceive opportunities and threats, exploit opportunities and re-align internal and external resources in reaction to the change of the environment (Teece, Pisano, and Shuen, 1997; Teixeira et al., 2021). Dynamic capabilities are essential to the survival and profitability of startups (particularly in technology-intensive industries). Startups are run in a technological turbulence, doubtful markets and absence of resources. Therefore, their profitability does not just consist in the possession of resources, but rather in their ability to change and renew in a flexible and quick adaptable way to fit in to the changing opportunities. Technological ability serves as a source of opportunity sensing and seizing, whereas the innovation culture increases the reconfiguration capability, so the start-ups can quickly pivot business models, redistribute resources, and introduce innovative solutions (El Hanchi and Kerzazi, 2020; Teixeira et al., 2021). Thus, dynamic capabilities operationalize the RBV resources whereby the formerly fixed technological capabilities are transformed into the adaptive organizational behaviors that directly and indirectly determine the profitability.

2.2.3 Innovation Diffusion Theory (IDT)

Rogers (1962) proposed a theory, Innovation Diffusion Theory (IDT), which explains how innovations are diffused within and between organizations. It uses elements of relative advantage, compatibility, complexity, triability and observability as determinants of innovation adoption. In the context of the current research, IDT offers understanding of the cultural impact of innovation on the process of acceptance and diffusion of new technologies and ideas in startups. A culture of support promotes the speed of diffusion of innovations, supports collective learning and scales the individual behaviors with the objectives of organizational innovations (Crossan and Apaydin, 2010). On the other hand, the internalization of technological advancement can be hampered by cultural resistance or misalignment and this postpones the results of innovation and increases profits. Therefore, IDT places technological capability within the framework of innovation culture to determine the rate at which startups can adopt, implement and use innovative practices in dynamic settings.

2.2.4 Linkages between Theories, IV, and DV

RBV, DCT and IDT integrated in whole would offer a complete theoretical basis to the concept of Influence of Technological Capability and Innovation Culture on Startup Profitability:

a. RBV explains potential value creating resources (technological capability and innovation culture).

b. DCT is a way of explaining how companies mobilize and adjust the resources in changing environments.

c. IDT describes the process of innovation adoption and diffusion of potential realized profitability.

In this integrated model:

a. Technological capability (IV) is a group of VRIN resources.

b. The organizational mechanism that facilitates resource transformation is innovation culture (mediator).

c. Startup profitability (DV) is the final result of performance - the expression of the sustained competitive advantage.

Innovation culture can, therefore, be seen as a contextualizing aspect, where internal technological resources (RBV) is brought in line with environmental adaptation mechanisms (DCT) and innovation adoption processes (IDT). This integrative perspective reflects internal and external factors of profitability of the startup.

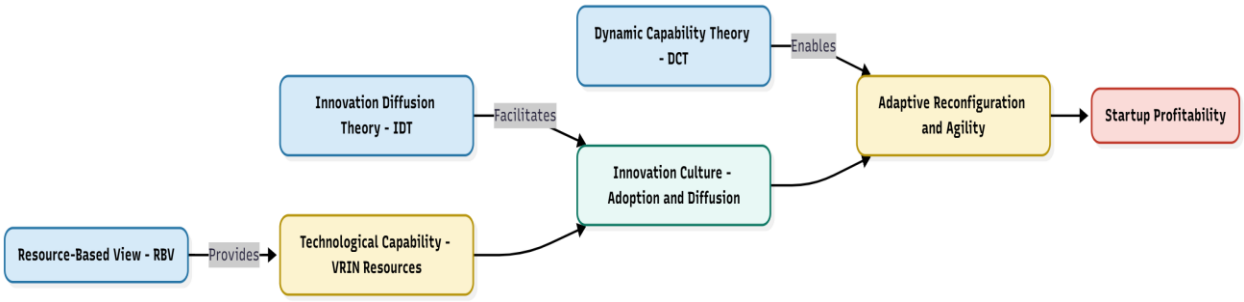

Figure 2.1: ***Theoretical Framework Integrating RBV, DCT, and IDT***

Source: Researcher's Design (2025)

The model emphasizes the fact that innovative and adaptable startups can be developed on the basis of technological capability. As companies have unique technological advantages, they develop an innovation-driven culture that promotes experimentation, learning, and spreading new ideas. It is then this culture that leads to adaptive reconfiguration and agility where the startups can react suitably to market instability and leverage new opportunities. As a result, the profitability of the startup is the manifestation of the capacity of the company to combine the resource strength, the influence of innovation, and the adaptive ability within the dynamic environment of the entrepreneurship.

2.3 Empirical Review

The contribution of technological capability to determining firm performance has been widely studied using empirical research that has demonstrated positive correlations but also have context-specific nuances. The existing large-sample research on the topic of SMEs and technology-based firms correlates technological capability (measured by R&D intensity, patents, ICT adoption, and absorptive capacity) with the outcome of innovation and firm performance in a positive way (Ahn et al., 2022; Tang et al., 2020; Salisu and Abu Bakar, 2020). Both longitudinal and panel studies also indicate that dynamic investment in technology and

managerial orientation toward learning enhance growth paths of startups (Teixeira et al., 2021; Li and Liu, 2014). The research based on the theory of absorptive capacity proves that companies that have greater ability to obtain and utilize external knowledge have better radical-innovation results (Cohen and Levinthal, 1990; Zhou and Li, 2012). Meanwhile, the empirical evidence suggests diminishing returns or slow profitability when the high initial R&D and infrastructure investments are not accompanied with commercialization potential (Ahn et al., 2022; Kumar et al., 2024).

Another empirical wave of study examines innovation culture, organization learning and managerial practices as sources of creative output and performance. According to cross-national and sectoral studies, a risk-taking, experimentation, knowledge sharing, and transformational leadership-supporting organizational climate is associated with high performance in innovation (Crossan and Apaydin, 2010; Chen et al., 2014). According to the studies on organizational agility, the culture that integrates the values of clan and adhocracy (also known as an agile culture by some academics) is especially suitable to the digital innovation inside the startups and incumbent organizations (Goncalves et al., 2020). Empirical studies carried out on services and manufacturing SMEs show that stimulus of innovation (training, leadership, market orientation) is transformed into innovation capacity and, eventually, higher performance in case it is supported by learning-oriented cultures (Prajogo & Ahmed, 2006; Calantone, Cavusgil, and Zhao, 2002; Alegre and Chiva, 2013).

A number of empirical studies specifically concentrate on interaction of innovation culture and technological capability to determine the relationship between such factors and profitability of firms. The moderated mediation and conditional-process research studies confirm that entrepreneurial orientation and marketing/architectural capabilities enhance the relationship between the innovation and profits (Arunachalam et al., 2018). Likewise, using the example of FinTech, as well as other digital-based startups, it has been found that institutional supports (incubators, seed funding) and firm-level strategic capabilities will hasten break-even and profitability, indicating that technology is not sufficient without facilitating organizational and institutional environments (Carbó-Valverde et al., 2022; Jun, Yi, and Amenuvor, 2024). In other studies, it is emphasized that relational capabilities and learning capability may mediate or reverse what would otherwise be positive relationships - such as relational capability may have negative direct relationships to performance except in the presence of learning capability to transform relations into value (Salisu and Abu Bakar, 2020).

Boundary conditions are important with contextual and sectoral studies. The data provided by the SMEs of China show that technological capability is more relevant in manufacturing than in the service sector, and the culture of innovation is of higher significance in the service sector (Tang et al., 2020). There is cross-sectoral research on digital entrepreneurship by finding that the success of digital ventures in ecosystems such as the Yabacon Valley in Lagos is influenced by IT culture and personal innovativeness (Abubakre, Zhou, and Zhou, 2022). Empirical studies that are country- and region-specific - such as those of an African or developing-country context - indicate structural bottlenecks (finance, skills, laborious R&D ecosystems) that postpone profitability even in technology adoption scenarios (Mohammed & Sundararajan, 2023; Aliyu, 2024). These contextual results highlight the idea that industrial; organization size; funding structure; and ecosystem supports mediate the technology profit association (Carbó-Valverde et al., 2022; Tang et al., 2020).

Empirical works also look at managerial systems and human resource interventions that facilitate transformation of technology to profits. The research studies on agile performance management, strategic human resource practices, and training intervention indicate managerial attitudes and HR systems are very influential in the outcomes of innovation and firm performance (Sundararajan et al., 2023; Aliyu, Jakada, and Lawal, 2023; Aliyu et al., 2024). A study of entrepreneurial marketing and the marketing mix shows that promotion, pricing and product strategy have a significant impact on

financial performance in tech startups - and the impact of these marketing mix components is mediated by entrepreneurship attributes (risk-taking, networking) (Thulasipriya and Rodrigues, 2025). This evidence indicates that technological investments require managerial and marketing skills to be implemented to achieve profitability (Arunachalam et al., 2018; Jun et al., 2024).

The diversity of methodologies has typified the empirical literature: scholars have used cross-sectional surveys, PLS-SEM, OLS and ordered probit, panel survival and qualitative comparative designs. Not only solid patterns are brought out by this diversity but also apparent contradictions. As an example, technological capability is positively correlated with performance in most studies (Ahn et al., 2022; Li and Liu, 2014), but non-significant (or industry-specific) in others (Teixeira et al., 2021; Tang et al., 2020). On the same note, the importance of relational capability and networks is occasionally exhibited as either positive or contingent on absorptive or learning capabilities (Salisu and Abu Bakar, 2020). These inconsistent results indicate complicated mediation and moderation frameworks that need to undergo conceptual unpacking and combined outlines of elucidation.

Lastly, there is a recent body of empirical research into startups in emerging digital economies that points towards the velocity and channels that enable technology and culture to generate commercial payoffs. Research of platform and FinTech projects shows that access to accelerators, seed funding, and governance institutions can impact time-to-profitability, and innovation culture can impact the internal diffusion and exploitation of technologies (Carbó-Valverde et al., 2022; Arunachalam et al., 2018). It is also recognized in empirical syntheses that micro foundations between resources and profit yields are knowledge-creating routines, absorptive capacity and dynamic reconfiguration capabilities (sensing, seizing, transforming) (Nonaka and Takeuchi, 1995; Teece, 2007; Helfat and Peteraf, 2003).

2.4 Research Gap

In spite of the increasing and large body of empirical research, gaps are evident. To begin with, the integrated conceptual frameworks that explicitly bring together the multidimensional specificities of technological capability, as well as innovation culture as a mediating factor to describe the startup profitability in different contexts, are lacking; most empirical studies are focused on partial pathways or single dimensions, instead of a harmonized and multi-dimensional framework (El Hanchi and Kerzazi, 2020; Tang et al., 2020). Second, there is a lack of conceptual clarity on how a multidimensional IV (technological capability) needs to be operationalized in comparison to a unidimensional DV (profitability); empirical studies result in mixed results since they either consider technology as an aggregate concept or consider it as independent measures without testing cross-dimension effects and mediators (Salisu and Abu Bakar, 2020; Calantone et al., 2002). Third, the theory and startup profitability have too little connection, particularly in the digital and developing-economy setting: most theoretical frameworks (RBV, DCT, IDT) are not applied in testable models that capture the resource, capability, and diffusion processes operating in emerging systems (Teece, 2007; Cohen and Levinthal, 1990; Nonaka and Takeuchi, 1995). Finally, there are empirical contradictions, such as relational capability exhibiting negative direct effects, becoming positive under learning capability, indicating the need to synthesize a conceptual model explicitly to map mediators, moderators, and boundary conditions (Salisu & Abu Bakar, 2020; Teixeira et al., 2021). The multidimensional technological capability, innovation culture, and profitability pathways, partly formulated with the assistance of the multi-facet conceptual framework suggested in the present research are needed to fill in these gaps and make explicit propositions that can be validated subsequently in the future.

2.5 Model of the Study

The suggested design of the research incorporates technological capability (independent variable) and innovation culture (mediating variable) and the profitability of a startup (dependent variable) in a single conceptual framework. The model is conceptualized based on the Resource-Based View

(RBV), Dynamic Capability Theory (DCT), and Innovation Diffusion Theory (IDT) to perceive technological capability as a multidimensional construct that includes research and development (R&D) capability, absorptive capacity, digital and ICT competence, innovation and product development capability, and infrastructure resource base. All these dimensions compose the technological backbone on which startups develop their competitiveness and level of operational mobility. Nevertheless, it is the mediating factor of innovation culture dynamic organizational environment, which facilitates creativity, experimentation, risk-taking, and continuous learning, that needs to be in place to result into the actual performance with technological potential. In this model, innovation culture is the change agent connecting the technical center of startups and their financial performance. It helps the firms to convert their technological resources into marketable products and adaptive strategies that will improve profitability. Innovation culture fosters better positioning of startups to exploit their technological strengths to gain a quicker market responsiveness, product diversification and customer value generation. This is consistent with the conceptualizations of organizational learning and knowledge integration as fundamental mediating variables that exist between resources and firm performance in the past (Crossan and Apaydin, 2010; Teece, 2007).

The dependent construct, startup profitability, is handled as a unidimensional measure, which depicts the final stage of strategic technological investments and operations based on innovation. It summarizes such indicators as the return on investment, growth of revenue, and cost efficiency. According to this model, technological capability directly and indirectly influences profitability, and the indirect influence is through innovation culture. Such a two-way relationship means that technology is beneficial in that it increases the capacity and the efficiency of the operations, but its highest effect is achieved through the combined use of the culture that encourages the spread and use of innovations at every level of the startup. This model, in terms of theory, helps to build the body of knowledge by combining both technological and cultural aspects in the context of profitability. It supports the thesis that technological competence without installed in organizational culture that promotes innovation and learning is not sufficient to sustainable profitability. The integrated view is the foundation of the idea to propose propositional tests in future empirical research to further develop the knowledge of the ability of startups to match internal resources and cultural characteristics strategically to achieve financial performance in turbulent digital environments.

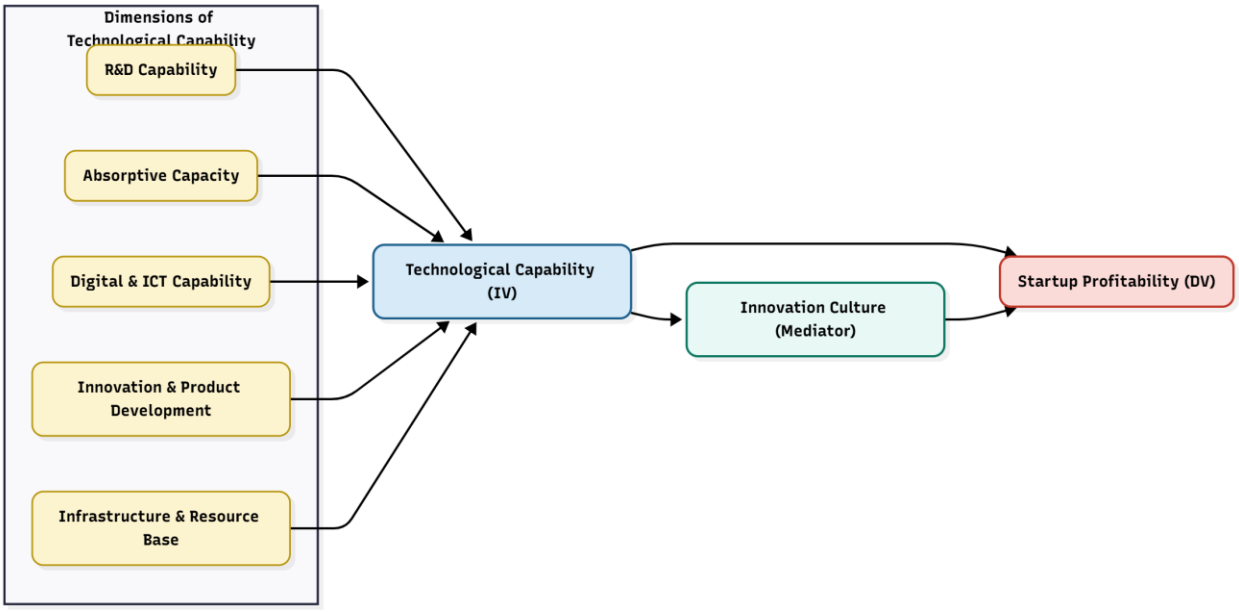

Figure 2.2: ***Proposed Model of the Study Linking Technological Capability, Innovation Culture, and Startup Profitability.***

Source: Researcher's Design (2025)

The model gives importance to the fact that the technological capability forms the backbone due to which the startups form their competitiveness and profitability. Companies, endowed with high levels of R&D, ICT capabilities and absorptive capacity, are in a better position to develop an innovation-focused culture, which serves as a mediating process between the technological prowess and performance deliverables. Such culture fosters experimentation, continuous improvement, and adaptive learning which, in the end, results in increased profitability of the startup. Therefore, the mediated and direct route illuminate the twofold role of technological infrastructure and organizational culture in maintaining growth in innovation-based entrepreneurial ecosystems.

3.0 Research Methodology

This research takes a conceptual/qualitative synthesis method in that it is not aimed at testing the hypothesis but integrates the theoretical ideas. The conceptual analysis research design is based on previous theories, models, and existing empirical studies that have been synthesized to come up with a complete view of the interaction of technological capability and innovation culture to impact start up profitability. The research is only based on the sources of secondary data, such as the peer-reviewed journal articles, conference papers, and academic reports, covering the field of entrepreneurship, technological innovation, and organizational performance. These sources were chosen with a lot of cautiousness due to their theoretical content, methodological soundness and pertinence in the aims of the study. The style of their analysis is thematic synthesis and conceptual mapping, in which the common patterns, dimensions, and connection between constructs were recognized and grouped to develop conceptual framework and proposed model. In this manner, the research makes the links between the technological and cultural aspects of startup success which offer a combined theoretical outlook.

Various scholarly sources triangulation was employed to obtain the validity and rigor of the study and that is why the insights are anchored on the different theoretical and empirical contributions in the different fields. This adds more credibility and wholeness to the conceptual propositions that are espoused. Finally, the moral aspects were also taken

care of in the course of study. The paper upholds academic integrity, citation and reference transparency, and every intellectual contribution that underwent synthesis to come up with the idea that forms the concept as per the academic practices of responsible academic writing.

4.0 Findings of the Study

4.1 Thematic Insights from Literature Review

1. In the literature, it has been found out that technological capability, which comprises of infrastructure, knowledge management and R and D competence is a significant factor that determines profitability and performance of startups.

2. The culture of innovation promotes innovation, flexibility and initiative in problem-solving - important qualities that help startups react effectively to the changes in the market.

3. Research shows that culture of innovation is the mediating factor that exists between technological capability and profitability, altering technical resources to innovation results, which is value-oriented.

4. According to a conceptual synthesis based on the Resource-Based View (RBV), Dynamic Capability Theory (DCT), and Innovation Diffusion Theory (IDT), internal resources and innovation-oriented values are coupled in their role in entrepreneurial success.

4.2 Conceptual Relationships among Key Variables

1. Through enhanced operational efficiency, innovation, and scalability, the relatedness between technological capability (IV1) and startup profitability (DV) is positive.

2. This relationship is reinforced by the culture of innovation (IV2) which helps to create the environment in which the innovative idea based on the technologies may be transformed into the profitable business.

3. The cultural mediating factor is the innovation culture, which provides that technological capability is converted into a continuous improvement process and a competitive differentiation.

4. The conceptual model proposed will combine technological capability with innovation culture and profitability with the accent on the synergistic interaction of resources, culture, and performance.

4.3 Theoretical Implications of the Conceptual Model

1. The research provides evidence of the Resource-Based View (RBV), which reveals that technological infrastructure and knowledge assets are strategic resources that bring about sustainable profitability.

2. It supports the Dynamic Capability Theory (DCT), which emphasizes the fact that companies have to be continuously flexible and reorganize technological capabilities to ensure competition.

3. It builds upon the Innovation Diffusion Theory (IDT) by showing how the innovation-focused cultures can speed up the process of accepting and diffusing new technologies within startups.

4. On the whole, this model helps to fill the gap between literature in technology management and literature on innovation culture as it demonstrates a co-evolutionary process between capabilities, culture, and performance outcomes.

4.4 Managerial and Policy Implications

1. Companies with high technological potential and culture of experimenting are more likely to succeed as compared to those based on capital or access of the market.

2. Creativity, agility, and profitability are promoted through the encouragement of cross-functional knowledge sharing and R&D investment.

3. Policymakers have a crucial role to play in facilitating innovation systems that support tech-based entrepreneurship by providing funds, mentorship and infrastructure.

4. To achieve sustainable startup profitability requires a match between technological investments and an innovation-friendly culture of encouragement of learning, flexibility, and risk-taking calculatedly.

5.0 Recommendations of the Study

5.1 Strategic Recommendations for Startups

1. To develop adaptive technological capacities, the startups must invest in effective technological infrastructure and a continuous upgrade.

2. Innovation culture should be incorporated into the organizational values of founders by being promoted through experimentation, open communication, and creative solutions.

3. Companies ought to combine innovation efforts and technology to convert ideas into market products and processes.

4. To remain profitable on the long term, the startups should be able to build strategic alignment of technology, innovation and business objectives.

5.2 Policy Recommendations

1. Governments and regulatory authorities ought to come up with bodes of innovations and innovation hubs and incubators to avail modern technology and mentoring to startups.

2. To encourage tax breaks, low interest financing, or grants to encourage the development of technological capability, policymakers must encourage R&D investments.

3. The partnerships between the government and the business society should be reinforced to create a culture of digital literacy and innovation in the business world.

4. The policy of knowledge management systems and technology transfer systems used should be made as a priority to the national innovation policy to make startups competitive.

5.3 Research Recommendations

1. The proposed conceptual model needs to be confirmed in future empirical research based on the data of startups in different industries and regions.

2. The moderating variables that should be explored by the researchers include leadership style, size of the firm and turbulence in the market on the technology-innovation-profitability nexus.

3. The longitudinal research is required to trace the change in innovation culture with time in regard to the technological development.

4. The comparison of the developed and developing economies can shed light on the differences in contextual differences in technological capability and innovation outcomes.

6.0 Conclusion

6.1 Summary of Key Insights

In this theoretic paper, technological capability and innovation culture have been discussed in the degree of profitability of the startups according to the Resource-Based View (RBV), Dynamic Capability Theory (DCT) and Innovation Diffusion Theory (IDT). The synthesis revealed that startups with good technological grounds; such as infrastructure, research and development capabilities and knowledge management abilities would work better as compared to others in case these competencies were enhanced with an innovation based culture. The innovation culture is a compelling mediator that can transform technological possibilities into a profitable outcome with the help of creativity, experimentation and flexibility. All these findings combined tend to point to the fact that technology does not hold the secret of the sustainable profitability of startups, but a mixture of the power of technology, and the facilitating organizational culture.

6.2 Theoretical and Managerial Implications

In theory, the study contributes to the development of the interaction between multidimensional technological capability and innovation culture, in order to determine the startup profitability. It combines the views of RBV, DCT and IDT in one conceptual approach that describes how the combination of internal resources, process adaptations and cultural values determine the performance of a firm. Managerially, the study also highlights that leaders should not just invest in technologies but they should also foster a culture that enhances innovation based decision making.

Managers are encouraged to work on the development of R&D abilities, cross-functional teamwork and creation of an atmosphere of learning that enables ideas to develop into marketable innovations.

6.3 Final Reflections on Innovation, Technology, and Profitability

The capacity of startups to sustain profitable in the changing digital economy lies in the capability of merging technological progress and cultural innovation. The tools of change are technology, whereas the culture of innovation offers the attitude of continuous improvement and strategic resiliency. Hence, to achieve success in the 21st century, startup must be combined with both; technology as the facilitator and the culture as the driver. The given theoretical ground is an avenue within which the future empirical research can be performed, and can serve as a roadmap to the entrepreneurs and policymakers wishing to create innovation-driven, technology-enhanced and profitable start-up landscapes.

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