

The impact of digital transformation and the regulatory role of organizational culture on business model innovation in enterprises: A case study of tech startups in Vietnam

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Abstract: This research addresses the critical question of how digital transformation drives business model innovation in technology startups and how organizational culture moderates this relationship—an important gap in existing studies, particularly within the context of emerging economies such as Vietnam. While previous research has examined digital transformation and innovation separately, few empirical studies have explored the interaction between digital initiatives and internal cultural factors in startup environments. The purpose of this study is to provide a deeper understanding of these dynamics and offer insights that are relevant to Vietnam's startup ecosystem. To achieve these objectives, a quantitative research design was employed, involving the distribution of structured survey questionnaires to managers and founders of technology startups that have been operating for at least three years in Ho Chi Minh City, Da Nang, and Hanoi. A total of 327 valid responses were collected and analyzed using a three-step hierarchical regression technique to test the proposed hypotheses. The results demonstrate that digital strategy, technology application, and digital capabilities significantly enhance business model innovation. Moreover, organizational culture serves as a positive moderator, strengthening the impact of digital transformation efforts on innovation outcomes. Theoretically, this study contributes to the literature by integrating dynamic capabilities theory and organizational culture theory, offering empirical validation and extending these frameworks within an emerging market context. Practically, the findings provide actionable insights for startup managers, emphasizing the necessity of not only investing in digital technologies but also fostering a flexible, innovation-driven organizational culture.

Keywords: *Business model innovation, Digital transformation, Organizational culture, Technology startups.*

1. Introduction

The emergence and advancement of digital technologies are fundamentally reshaping industries worldwide, transforming traditional business models and fostering new opportunities for innovation. Digital transformation - characterized by the deep integration of digital technologies into business operations - has become a strategic imperative for organizations seeking to sustain long-term competitive advantages.

In Vietnam, the 13th National Congress of the Communist Party of Vietnam identified the development direction of the country as one that is grounded in science, technology, and innovation. Based on this vision, the Vietnamese legal framework for science, technology, and innovation has continued to evolve. As of early 2025, Vietnam has enacted eight laws directly related to digital transformation, alongside numerous other relevant legal documents. These include four government resolutions and over 160 decrees, decisions, and circulars guiding implementation. Since the beginning of the 15th National Assembly's term, eight additional laws related to digital transformation have been passed. Notably, 29 laws and 41 resolutions adopted during the 7th and 8th sessions of the National

Assembly have addressed pressing practical issues, including legislation on digital data infrastructure; governance mechanisms; preferential policies related to the application of science, technology, and digital transformation; and the authorization of controlled pilot programs for the research, production, and commercialization of new products, services, and business models.

Overall, Vietnam's current legal system has introduced numerous mechanisms and preferential policies to encourage investment, finance, human resource development, and the promotion of science, technology, innovation, and digital transformation. This is clearly reflected in key legislative acts, including the Li, et al. [1]; Li, et al. [2]; Li and Luo [3]; Malik, et al. [4] and Martins and Terblanche [5].

Supported by this robust legal framework, Vietnam's digital economy has experienced rapid expansion - accounting for approximately 16.5% of Gong and Ribiere [6] - with projections to reach 20% by 2025, according to the Ministry of Planning and Investment (MPI) [7]. Notably, technology startups have emerged as key drivers of this growth, making significant contributions to innovation, job creation, and economic dynamism.

The 2023 Vietnam Innovation and Technology Investment Report by the National Innovation Center (NIC) highlights that Vietnam has recorded over 3,800 active startups, with Ho Chi Minh City and Hanoi ranked among the top 100 emerging startup ecosystems globally [8, 9]. However, in an increasingly competitive and digitalized market, technology adoption alone is insufficient. Business Model Innovation (BMI) - the reconfiguration of a company's mechanisms for creating, delivering, and capturing value [10] - has become essential for startups to survive and succeed. BMI enables startups to adapt to dynamic market demands, leverage new technological opportunities, and differentiate themselves in saturated markets.

Nevertheless, the success of digital transformation initiatives is not determined solely by technological capabilities. Several studies suggest that organizational culture plays a crucial moderating role in facilitating or hindering the translation of digital transformation efforts into effective business model innovations [11, 12]. A culture emphasizing flexibility, learning, collaboration, and innovation can significantly enhance an organization's ability to exploit digital tools and processes for transformative business model changes. Conversely, rigid or hierarchical cultures can stifle innovation even when substantial investments in technology are made [13, 14].

Empirical findings on the impact of digital transformation on business model innovation, however, remain inconsistent. Some studies have found a positive relationship, such as Li, et al. [1] who demonstrated that digital technologies facilitated business model restructuring in Chinese manufacturing firms; Verhoef, et al. [15] who asserted that digital transformation enhances flexibility and business model innovation in European service firms; and Karimi and Walter [16] who found that digital transformation initiatives positively influenced business model innovation in traditional media companies adapting to digital disruption.

Conversely, other studies have identified negative relationships. For instance, Susanti, et al. [17] argued that poorly managed digital transformation initiatives could disrupt existing business models in Indonesian SMEs; Hanelt, et al. [18] and Denison and Mishra [19] found that digital transformation could lead to organizational inertia, inhibiting business model innovation; and Clohessy, et al. [20] emphasized that digital transformation sometimes increases complexity, making business model innovation more difficult in certain industries. Some research even found no significant relationship between digital transformation and business model innovation. Matt, et al. [21] concluded that digital transformation efforts in traditional firms had little impact on business model change without accompanying organizational shifts, while Gong and Ribiere [6] found that isolated digital initiatives were insufficient to drive business model innovation in SMEs without strategic leadership and cultural readiness.

The divergence in research findings is attributed to several factors, including institutional differences across countries, as proposed by Aiken and West [22] who emphasized that national institutional frameworks significantly influence organizational responses to innovation. Methodological

gaps in estimation techniques [23] and contextual, environmental, and industry-specific factors - such as market volatility, technological advancements, regulatory environments, and firm size - further complicate the relationship between digital transformation and business model innovation.

Moreover, while the influence of organizational culture on innovation has been widely recognized [11, 19] its precise moderating role in the relationship between digital transformation and business model innovation has not been thoroughly examined. This gap is particularly evident in Vietnam's rapidly evolving startup ecosystem, where digital transformation is occurring alongside dynamic changes in entrepreneurial culture, organizational support, and market demands. The unique characteristics of Vietnamese technology startups necessitate an empirical investigation into how organizational culture moderates the effectiveness of digital transformation efforts in driving business model innovation.

Therefore, this study aims to examine the impact of digital transformation on business model innovation in technology startups in Vietnam and to explore the moderating role of organizational culture in this relationship. Specifically, the study seeks to answer the following research questions: (i) How does digital transformation affect business model innovation in technology startups? (ii) How does organizational culture moderate the relationship between digital transformation and business model innovation?

Answering these questions will provide valuable insights for startup founders and policymakers seeking to foster innovation and enhance the competitiveness of Vietnamese technology startups.

2. Theoretical Basis and Hypothesis Development

2.1. Theoretical Basis

2.1.1. Digital Transformation

Digital transformation refers to the profound and accelerating integration of digital technologies into all areas of business operations, fundamentally changing how organizations deliver value to customers and compete in the marketplace. It is not merely about adopting new technologies but involves a strategic shift in mindset, organizational processes, and business models [12, 24].

The key components of digital transformation include technology adoption, digital capabilities, and organizational change. Technology adoption encompasses the implementation of advanced digital tools such as cloud computing, big data analytics, artificial intelligence, and Internet of Things (IoT) to improve efficiency and decision-making [25]. Digital capabilities refer to the organization's ability to leverage digital technologies to create new value propositions, enhance operational agility, and foster customer-centric innovation [17].

The impact of digital transformation on organizational processes is substantial. It streamlines operations by automating workflows, enhances real-time decision-making through data analytics, and reduces transaction costs. Moreover, digital transformation profoundly reshapes customer engagement by enabling personalized experiences, multi-channel interactions, and co-creation of value with customers [15]. For technology startups, digital transformation offers critical opportunities to rapidly scale, differentiate offerings, and access global markets, although it also presents challenges related to technological complexity and strategic alignment.

2.1.2. Business Model Innovation

BMI refers to the process through which a firm innovates its business model to create, deliver, and capture value in novel ways [10, 26]. Unlike product or process innovation, BMI requires a holistic rethinking of how a company operates and generates revenue, often leading to more sustainable competitive advantages.

BMI can be analyzed through three primary dimensions:

(i) Value Creation: Developing new products, services, or customer experiences that address unmet needs or create new markets.

(ii) Value Delivery: Changing how the firm delivers products or services to customers, including distribution channels, partnerships, and customer relationships.

(iii) Value Capture: Innovating revenue models, pricing strategies, or cost structures to enhance profitability.

For technology startups operating in highly dynamic markets, BMI is particularly critical. Startups often face volatile technological trends, shifting customer preferences, and intense competition. In such environments, the ability to continuously innovate the business model becomes a key determinant of survival and growth [27]. Digital transformation acts as a catalyst for BMI by opening new avenues for value creation and enabling more efficient value capture mechanisms.

2.1.3. Organizational Culture

Organizational culture is defined as the shared values, beliefs, and norms that influence the way employees think, feel, and behave within an organization [28]. Culture shapes organizational identity, guides behavior, and plays a significant role in determining how firms respond to internal and external challenges.

According to Schein [28] organizational culture operates at three levels: artifacts (visible structures and processes), espoused values (strategies, goals, philosophies), and basic underlying assumptions (unconscious, taken-for-granted beliefs). Several typologies categorize organizational cultures, with the Competing Values Framework [11] being one of the most widely used. This framework identifies four types of culture:

(i) Innovative (Adhocracy) Culture: Emphasizes creativity, risk-taking, and adaptability. It is highly conducive to innovation.

(ii) Hierarchical Culture: Focuses on formal structures, control, and efficiency. This can hinder innovation if rigidity outweighs flexibility.

(iii) Market-Oriented Culture: Prioritizes competitiveness, goal achievement, and customer focus, which can drive market-based innovations.

(iv) Clan Culture: Emphasizes collaboration, teamwork, and employee involvement, fostering a supportive environment for innovation.

Organizational culture has a profound influence on innovation processes. An innovative or flexible culture can significantly enhance a firm's ability to leverage digital technologies for business model innovation by promoting experimentation, learning, and openness to change [5, 19]. Conversely, a rigid or hierarchical culture may inhibit the realization of the full potential of digital transformation initiatives, thereby limiting business model innovation.

Thus, understanding the moderating role of organizational culture is crucial, particularly for technology startups in Vietnam, where rapid technological adoption must be matched by adaptive and innovation-friendly cultural practices to drive successful business model innovation.

2.1.4. Theoretical Framework

This study is grounded in two prominent theoretical perspectives: Dynamic Capabilities Theory and the Resource-Based View (RBV). These frameworks provide a comprehensive lens for understanding how digital transformation and organizational culture influence business model innovation in technology startups in Vietnam.

The Dynamic Capabilities Theory Teece, et al. [29] posits that in rapidly changing environments, a firm's competitive advantage stems not from its existing resource base alone but from its ability to integrate, build, and reconfigure internal and external competencies to address shifting market conditions. Digital transformation represents a dynamic capability that enables startups to reconfigure their resources, processes, and strategies to create new value propositions and capture emerging opportunities. Specifically, the adoption of digital technologies enhances a firm's sensing, seizing, and transforming capabilities, which are critical for continuous business model innovation [30]. In the volatile environment of Vietnam's startup ecosystem, where technological shifts and customer

expectations evolve rapidly, dynamic capabilities facilitate not just adaptation but proactive innovation in business models.

Complementing this, the Resource-Based View emphasizes that sustainable competitive advantage is achieved through the possession and strategic deployment of valuable, rare, inimitable, and non-substitutable (VRIN) resources [31]. From an RBV perspective, digital capabilities and organizational culture are critical intangible resources that can drive business model innovation. A strong digital capability allows startups to leverage technology for operational excellence and customer innovation, while an innovation-oriented organizational culture fosters creativity, risk-taking, and strategic alignment. In this sense, organizational culture moderates the relationship between digital transformation and BMI by shaping how digital resources are interpreted, deployed, and integrated into the strategic renewal of the business model [32, 33].

By integrating these two theories, this study conceptualizes digital transformation as a dynamic capability that drives business model innovation, while organizational culture is viewed as a critical internal resource that conditions the effectiveness of this transformation. Understanding this interaction is particularly relevant for technology startups in Vietnam, where the ability to innovate rapidly and effectively can determine survival and long-term success in an increasingly digital and competitive market environment.

2.2. Hypothesis Development

2.2.1. Digital Transformation and Business Model Innovation in Enterprises

Several empirical studies have identified a positive relationship between digital transformation and business model innovation. For example, Li, et al. [2] in a study of Chinese manufacturing firms, found that digital technologies such as big data analytics and the Internet of Things (IoT) enabled companies to innovate their business models by delivering new services and enhancing customer value. Similarly, [17] in their research on Indonesian SMEs, demonstrated that digital transformation initiatives positively influence firms' ability to modify their mechanisms for value creation and capture. Verhoef, et al. [15] further emphasized that digital transformation provides firms with the dynamic capability to adjust their business models in response to changing customer demands and competitive pressures. Moreover, Han [34] indicated that digitization drives business innovation and firm performance, suggesting that active engagement with technology can lead to significant changes in operational structures and market offerings. Azieva, et al. [35] also stressed that achieving operational excellence requires effective digital transformation, including the integration of new technologies that enhance efficiency and support business model development. Li, et al. [1] reinforced these arguments by presenting a competence-based perspective, highlighting how SMEs can leverage digital transformation to innovate business models. They argued that adopting e-commerce strategies constitutes a fundamental shift that enables entrepreneurs to redesign their business models and strengthen their competitive positioning. This view aligns with findings by Mihardjo, et al. [36] who emphasized the importance of digital leadership for business model innovation in the context of technological disruption, showing that organizations fostering a culture of innovation are better positioned to navigate the digital landscape.

However, some studies argue that under certain conditions, digital transformation can complicate or even hinder business model innovation. While digitization theoretically enhances business performance, practical implementation often encounters organizational inertia driven by existing culture or resource constraints. Nejatian, et al. [37] and Malik, et al. [4] highlighted that successful organizational change through digital transformation requires strong leadership and strategic vision, as not all companies effectively convert digital initiatives into tangible business model innovations. This suggests that although there is generally a positive correlation between digital transformation and business model innovation, the effectiveness of this relationship is influenced by organizational culture and strategic approaches.

In the context of Vietnamese technology startups, where market dynamism, technological adoption, and entrepreneurial orientation are robust, digital transformation is expected to serve as a catalyst for creative business model restructuring. Based on the theoretical foundations and empirical findings discussed above, the following hypothesis is proposed:

H₁: Digital transformation has a positive impact on business model innovation.

2.2.2. The Moderating Role of Organizational Culture

Effective digital transformation initiatives, particularly when embedded within a culture that values innovation and risk-taking, have been shown to drive business model innovation across various industries [38, 39]. In the context of digital transformation, Kane, et al. [40] found that companies with cultures supportive of change and experimentation were significantly more successful in leveraging digital technologies to innovate their business models. Specifically, in environments characterized by rapid change, such as technology startups, a culture that embraces change, encourages learning, and supports entrepreneurial behaviors amplifies the benefits of digital transformation, enabling startups to continuously restructure their mechanisms for value creation, delivery, and capture [15, 25, 41].

Furthermore, research in this field emphasizes that cultural attributes such as shared values, openness to change, and collaboration are critical determinants that either facilitate or hinder the realization of digital investments into new business models [3]. Such insights are particularly relevant in the context of technology startups in emerging markets like Vietnam, where rapidly shifting market dynamics demand adaptive organizational models [38, 42].

However, Hanelt, et al. [18] reported that even in companies undergoing digital transformation, hierarchical or rigid cultures could diminish the capacity for business model innovation by fostering resistance to change and inhibiting employee experimentation. Jones, et al. [43] argued that certain types of organizational culture - particularly those emphasizing tight control, risk aversion, or short-term financial performance - negatively impact digital initiatives, leading to incremental rather than radical innovation. Additionally, Denison and Mishra [19] emphasized that while mission- and involvement-oriented cultures positively influence innovation, consistency-oriented cultures that prioritize stability and uniformity may hinder transformational change efforts. Thus, the nature of the moderating effect largely depends on the specific cultural attributes present within the organization.

In the context of Vietnamese technology startups, where rapid digital adoption coincides with evolving entrepreneurial cultures, understanding this moderating role is particularly important. A culture that promotes flexibility, innovation, and proactive learning is likely to enhance the positive impacts of digital transformation on business model innovation. Conversely, a misaligned organizational culture may obstruct the full realization of digital transformation benefits.

Based on these theoretical insights and empirical findings, the following hypothesis is proposed:

H₂: Organizational culture positively moderates the relationship between digital transformation and business model innovation.

The research model is structured as follows:

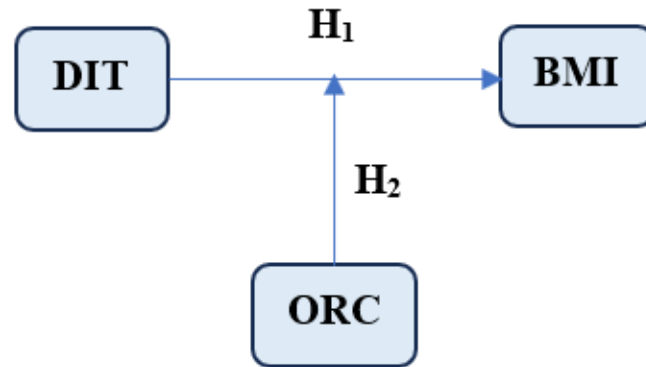


Figure 1.
Research Model.

In which:

Independent Variable: Digital Transformation (DIT)

Moderating Variable: Organizational Culture (ORC)

Dependent Variable: Business Model Innovation (BMI)

3. Research Methodology

This study employs a quantitative research design to examine the impact of digital transformation on business model innovation and the moderating role of organizational culture among technology startups in Vietnam. A cross-sectional survey method was applied to collect primary data.

Following the recommendation of Hair, et al. [44] a minimum of 300 valid responses was targeted to ensure statistical significance and the generalizability of the findings, particularly for structural equation modeling and moderation analysis.

The target population of this study includes technology startups operating in Vietnam across sectors such as fintech, edtech, healthtech, agritech, e-commerce, and enterprise software. To ensure representation across different development stages and industries, a stratified random sampling technique was used. Stratification was based on two criteria: years of operation and business type.

A total of 327 valid responses were collected. The startups were stratified by years of operation into three groups: Early-stage startups (under 3 years): 148 companies (45.3%); Growth-stage startups (3 to 5 years): 112 companies (34.3%); Established startups (over 5 years): 67 companies (20.5%).

In terms of business type, the sample included: Software and IT service startups: 152 companies (46.5%); E-commerce platforms and marketplaces: 94 companies (28.7%); Fintech and financial service startups: 43 companies (13.1%); Other technology-based startups (e.g., healthtech, agritech): 38 companies (11.6%).

Survey respondents primarily held senior management or leadership positions within their startups, ensuring they possessed sufficient knowledge about strategic initiatives and organizational culture. Specifically, the roles of the respondents were distributed as follows: Founder or Co-founder: 58.7%; Chief Executive Officer (CEO): 23.5%; Chief Technology Officer (CTO) / Chief Innovation Officer (CIO): 10.1%; Other senior managers (e.g., department heads, project leaders): 7.7%

Data collection was conducted using a structured questionnaire. The survey was distributed online via email invitations, startup community groups, LinkedIn, and Facebook startup networks, as well as offline through direct distribution at major startup hubs, including: Saigon Innovation Hub (SIHUB) in Ho Chi Minh City; DNES Da Nang Startup Hub in Da Nang; National Innovation Center (NIC Hanoi); BK Holdings (HUST) – the startup and technology transfer center affiliated with Hanoi University of Science and Technology.

The survey instrument included closed-ended questions measured on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) to capture respondents' levels of agreement with statements related to digital transformation, organizational culture, and business model innovation.

Data collection took place from December 2024 to April 2025. The study results are based on 327 valid responses, providing sufficient data for statistical analysis. Data cleaning and entry were performed using Excel spreadsheets before running analyses with SPSS 26.0 to ensure the accuracy and reliability of the findings.

During the data collection process, this study strictly adhered to research ethics, ensuring voluntary participation, informed consent, and respondent confidentiality. Participants were fully informed about the study's purpose, and their responses remained anonymous. Data was collected and stored securely, with no personally identifiable information disclosed or used for any purpose beyond this research.

4. Results and Discussion

4.1. The Scale Assessment

To assess the reliability, convergent validity, and discriminant validity of the measurement scales for the constructs, we conducted Cronbach's alpha tests and Exploratory Factor Analysis (EFA). The results showed that all corrected item-total correlations were above 0.6, indicating very good internal consistency (consistent with Cronbach's alpha values greater than 0.8). All factor loadings were above 0.74, suggesting satisfactory construct validity (factor loadings greater than 0.7 are considered strong according to Hair, et al. [44]). The Kaiser-Meyer-Olkin (KMO) values exceeded 0.7, and the significance value (Sig.) was 0.000, confirming that the factor structure was acceptable. The detailed results are presented in Table 1:

Table 1.
Scale evaluation results.

Factors and observed variables in the scales	Corrected Item - Total Correlation	Factor loadings
Digital Transformation		
Digital Strategy Vial [24] and Kane, et al. [40] (Cronbach's Alpha=0.870); (KMO=0.756; Sig.=0.000; Cumulative %=71.014%; Eigenvalues=1.157)		
Our company has a clear digital strategy that guides our business model and operations.	0.715	0.812
Digital initiatives are integrated into the overall strategic planning of our company.	0.698	0.801
Our leadership prioritizes digital transformation as a key driver for future growth.	0.732	0.826
Technology Application Vial [24] and Westerman, et al. [25] (Cronbach's Alpha=0.861); (KMO=0.756; Sig.=0.000; Cumulative %=71.014%; Eigenvalues=1.157)		
Our company actively adopts new digital technologies (e.g., cloud computing, big data, AI) to improve operations.	0.701	0.810
We regularly update and upgrade our technological infrastructure to stay competitive.	0.683	0.795
Digital tools and platforms are widely used across different departments in our company.	0.690	0.802
Digital Capabilities Vial [24] and Bharadwaj, et al. [12] (Cronbach's Alpha=0.879); (KMO=0.756; Sig.=0.000; Cumulative %=71.014%; Eigenvalues=1.157)		
Our company has the skills and competencies needed to leverage digital technologies effectively.	0.720	0.823
We are capable of quickly adapting to new digital trends and innovations.	0.734	0.831
Our employees are trained and empowered to use digital technologies in their daily tasks.	0.707	0.817
Business Model Innovation Clauss [10] (Cronbach's Alpha=0.797); (KMO=0.728; Sig.=0.000; Cumulative %=69.425%; Eigenvalues=1.157)		

Eigenvalues=1.964)		
Our company has introduced new products or services that address unmet customer needs.	0.655	0.765
We have developed innovative solutions that differentiate us significantly from competitors.	0.642	0.757
Our company has developed new ways of delivering products or services to customers (e.g., new distribution channels or platforms).	0.622	0.746
We have restructured internal processes or partnerships to improve how we deliver value to customers.	0.630	0.751
Our company has introduced new pricing models or revenue streams (e.g., subscriptions, pay-per-use, freemium models).	0.638	0.755
We have significantly changed how we capture value from customers compared to our original business model.	0.646	0.759
Organizational Culture Cameron and Quinn [11] (Cronbach's Alpha=0.820); (KMO=0.756; Sig.=0.000; Cumulative %=71.014%; Eigenvalues=1.157)		
Our company encourages employees to experiment with new ideas and approaches.	0.684	0.798
Innovation and creative thinking are strongly supported and rewarded in our organization.	0.670	0.786
Teamwork and collaboration across departments are highly valued in our company.	0.672	0.789
Employees are encouraged to share knowledge and support each other to achieve common goals.	0.687	0.794
Our organizational structure is flexible and adapts quickly to changes in the environment.	0.699	0.803
Employees are empowered to make decisions and adapt their work processes when necessary.	0.674	0.788

4.2. Hypothesis Testing

To test the proposed hypotheses, we applied a quantitative analysis method using hierarchical multiple regression analysis, following the guidelines of Aiken and West [22] and Cohen, et al. [45].

Hypothesis H1 examines the direct impact of digital transformation on business model innovation. To test H1, digital transformation was entered as an independent variable predicting business model innovation. A positive regression coefficient for the digital transformation variable would support H1, whereas a negative coefficient would not.

Hypothesis H2 investigates the moderating role of organizational culture in the relationship between digital transformation and business model innovation. Testing H2 involved a three-step hierarchical regression procedure:

Step 1: Control variables (if any) were entered into the regression model.

Step 2: The independent variable (digital transformation) and the moderator (organizational culture) were entered into the regression model.

Step 3: The interaction term (Digital Transformation \times Organizational Culture) was entered into the regression model.

Digital transformation was classified as a second-order construct and measured by the average of three dimensions: Digital Strategy, Technology Application, and Digital Capability. Organizational culture was classified as a first-order construct and calculated by averaging the observed variables within its scale before creating the interaction term, following [46] recommendation to minimize multicollinearity.

The significance of the interaction coefficient in Step 3 was assessed to determine the presence of a moderating effect.

Several criteria were used to validate the models: (i) Multicollinearity was assessed using the Variance Inflation Factor (VIF), with a threshold of $VIF < 5$ (Hair et al., 2019); (ii) The statistical significance of the coefficients was evaluated at the 5% level ($p < 0.05$); (iii) The incremental explanatory power of the interaction term was evaluated by the change in R^2 (ΔR^2) between Step 2 and Step 3 [47];

(iv) The strength of moderation was assessed by analyzing the increase in R^2 (ΔR^2) between Step 2 and Step 3 [47].

All analyses were conducted using SPSS 26.0, ensuring a rigorous examination of the direct and moderating relationships proposed in H1 and H2.

Thus, the study involves two regression models corresponding to the two hypotheses, H1 and H2. The regression results are presented in Table 2.

Table 2.

Hypothesis testing results.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Constant	0.832	0.218		3.816	0.000		
	Digital Strategy	0.298	0.073	0.284	4.082	0.000	0.678	1.474
	Technology Application	0.265	0.070	0.254	3.786	0.000	0.692	1.445
	Digital Capabilities	0.342	0.066	0.329	5.182	0.000	0.668	1.497
	Dependent Variable: Business Model Innovation, R square 0.605, ANOVA sig 0.000							
2	Constant	0.754	0.211		3.574	0.001		
	Digital Transformation * Organizational Culture	0.221	0.053	0.246	4.170	0.000	0.825	1.212

Note: Dependent Variable: Business Model Innovation, R square 0.644, ANOVA sig 0.000

Table 2 presents the results of the hypothesis testing. In Model 1, the effects of Digital Strategy, Technology Application, and Digital Capabilities on Business Model Innovation were examined. The results show that all three predictors have positive and statistically significant impacts. Specifically, Digital Strategy ($\beta = 0.284$, $p < 0.001$), Technology Application ($\beta = 0.254$, $p < 0.001$), and Digital Capabilities ($\beta = 0.329$, $p < 0.001$) significantly enhance Business Model Innovation. The model explains 60.5% of the variance in Business Model Innovation ($R^2 = 0.605$), and the overall model is significant (ANOVA, $p < 0.001$).

In Model 2, the moderating effect of the interaction between Digital Transformation and Organizational Culture on Business Model Innovation was tested. The interaction term is statistically significant ($\beta = 0.246$, $p < 0.001$), indicating that Organizational Culture positively moderates the relationship between Digital Transformation and Business Model Innovation. The inclusion of the interaction term improves the model's explanatory power, increasing R^2 to 0.644. Multicollinearity was not a concern, as all VIF values were below 2.0. Overall, the findings support the proposed hypotheses, confirming that digital-related capabilities and strategies, as well as cultural factors, are critical drivers of Business Model Innovation.

The findings of this study are consistent with several prior research efforts emphasizing the role of digital transformation in driving business model innovation. In particular, Bharadwaj, et al. [12] highlighted that digital capabilities serve as critical enablers for firms seeking to innovate their business models. These capabilities, including the deployment of digital resources and the cultivation of digital skills, have been shown to facilitate the creation of new value propositions and operational models. Our results reinforce this assertion, demonstrating that digital capabilities positively and significantly influence business model innovation among tech startups in Vietnam.

Similarly, Li, et al. [1] found that the adoption of digital technologies contributes substantially to enhancing organizational innovation performance. Their study indicated that companies leveraging digital tools and platforms experience improved agility, customer engagement, and process efficiencies, all of which are crucial drivers of business model innovation. The current study's findings confirm that technology application plays a pivotal role in fostering innovation within business models, thus supporting Li et al.'s conclusions.

Furthermore, the moderating role of organizational culture identified in this study is in line with the insights of Westerman, et al. [25]. According to their research, a supportive and adaptive organizational culture is a fundamental component for the successful execution of digital transformation initiatives. Our findings underscore the necessity of a conducive cultural environment, as organizational culture was found to significantly enhance the relationship between digital transformation initiatives and business model innovation outcomes among Vietnamese tech startups.

The study also reveals some divergences from existing literature. Notably, Susanti, et al. [17] argued that the application of technology alone may not significantly impact business model innovation unless accompanied by strong leadership and strategic external partnerships. Their research suggested that technological tools, in isolation, are insufficient to drive fundamental innovation without broader organizational support systems. Contrary to Susanti et al.'s findings, the results of this study indicate that Technology Application independently exerts a significant positive effect on business model innovation. This deviation may be attributable to the unique characteristics of the tech startup ecosystem in Vietnam, where firms often possess robust internal capabilities, such as entrepreneurial leadership, agile organizational structures, and a strong digital orientation. These features enable startups to effectively leverage technology without the immediate need for external collaborations or hierarchical leadership models. Such contextual differences highlight the importance of considering industry-specific and country-specific dynamics when evaluating the relationship between digital transformation and business model innovation.

This study's findings on the moderating role of organizational culture partially diverge from prior research. Hanelt, et al. [18] found that hierarchical cultures hinder business model innovation during digital transformation. Similarly, Jones, et al. [43] noted that control-oriented cultures limit radical innovation. Denison and Mishra [19] further emphasized that while participative cultures foster innovation, consistency-oriented cultures focused on stability may obstruct transformative change. In contrast, the current study finds that organizational culture acts as a positive moderator, strengthening the relationship between digital transformation and business model innovation among Vietnamese tech startups. This difference can be explained by the distinct cultural environment of tech startups in Vietnam, where entrepreneurial values, flexibility, proactive learning, and innovation are increasingly emphasized. In such a dynamic and growth-oriented context, organizational cultures promote experimentation and adaptability, thereby amplifying the benefits of digital transformation. Therefore, while previous studies highlighted the negative or conditional effects of certain cultural traits, the present findings suggest that in ecosystems characterized by entrepreneurial and innovation-driven cultures, the moderating effect of organizational culture is predominantly positive. Understanding these cultural attributes is crucial for interpreting the impact of digital initiatives on business model innovation in rapidly developing economies like Vietnam.

5. Conclusions and Contributions

To address our hypotheses, we first conducted a comprehensive review of the literature and examined foundational theories such as dynamic capabilities theory, organizational culture theory, and the business model innovation framework. Second, we collected insights through structured survey questionnaires from managers and founders of technology startups, including CEOs, CTOs, and innovation managers. Finally, we performed regression analysis on a sample of technology startups operating within major startup hubs and incubators in Ho Chi Minh City, Da Nang, and Hanoi. These companies had been in operation for at least three years, ensuring a certain level of operational stability.

Based on these steps, we drew the following conclusions: digital transformation - through digital strategy, technology application, and digital capabilities - positively impacts business model innovation. Furthermore, organizational culture positively moderates the relationship between digital transformation and business model innovation outcomes, highlighting the critical importance of fostering a flexible and innovation-driven environment within technology startups in Vietnam.

Theoretically, this study has proven that digital transformation is a critical driver of business model innovation in technology startups. By integrating dynamic capabilities theory and organizational culture theory, the research demonstrates that digital strategy, technology application, and digital capabilities directly and positively impact the evolution of business models. Furthermore, the study advances the theoretical understanding of organizational culture's moderating role, showing that a culture emphasizing flexibility, innovation, and proactive learning significantly enhances the effectiveness of digital initiatives. Unlike previous studies that highlighted the potential negative moderating effects of rigid cultures, this research highlights the positive influence of entrepreneurial cultures within the Vietnamese startup ecosystem. Therefore, the study not only validates existing theoretical frameworks but also extends them by providing empirical evidence from an emerging market context, where digital transformation and entrepreneurial dynamism are occurring simultaneously.

In practice, the results of this study will support managers at technology startups in Vietnam to realize the importance of strategically investing in digital transformation initiatives and simultaneously cultivating an organizational culture that fosters innovation. Managers are encouraged to go beyond merely adopting new technologies; they must also create environments that empower employees to experiment, learn, and embrace change. This dual focus will enable startups to maximize the benefits of digital transformation and drive more radical business model innovations, rather than limiting themselves to incremental improvements. Particularly for startups operating in dynamic and competitive markets such as Ho Chi Minh City, Da Nang, and Hanoi, fostering a culture that values agility, risk-taking, and continuous learning becomes essential for sustaining long-term growth. By aligning digital strategies with cultural development, Vietnamese tech startups can strengthen their competitive advantage and better navigate the challenges of the rapidly evolving digital economy.

There are several limitations to this study. First, due to time and budget constraints, the research sample was limited to technology startups located in selected provinces and cities. Future studies should consider sampling from a more diverse range of regions across Vietnam, where a significant number of technology startups also operate, in order to generate more representative and generalizable findings. Second, the study employed a quantitative research approach, relying on survey data collection and subsequent regression analysis to derive findings. This method may reflect the subjective perspectives of managers within the surveyed technology startups. Future research should incorporate longitudinal analyses to examine the dynamic processes through which digital initiatives influence innovation outcomes over time. Third, other potential moderating variables - such as the legal and regulatory framework or government support - were not included in the current model and could be explored in future research to provide a more comprehensive understanding of the factors influencing digital transformation and business model innovation.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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