

Impact of the Role of the State on Digital Transformation Activities of Enterprises: Insights from Vietnam

Dinh Van Cuong¹, Le Trung Hieu^{2*}

¹Company Limited Song Duong, Vietnam; dinhvancuongncs.qlkt@gmail.com (D.V.C.)

²VNU University of Economics and Business, Vietnam National University 144 Xuan Thuy str., Cau Giay district, Hanoi, Vietnam; hieult@vnu.edu.vn (L.T.H.).

Abstract. This study provides a comprehensive analysis of the role of the State in the digital transformation activities of enterprises in Vinh Phuc province, Vietnam. The study determines the primary correlations between the State's role and enterprise digital transformation initiatives using structural equation modeling (SEM). The State undertakes several roles, including policy formulation on digital transformation, financial support for enterprises, workforce training, building a digital ecosystem for enterprises, investing in digital infrastructure, and overseeing safety and e-commerce promotion. These roles statistically significantly impact enterprises' digital transformation activities. The results indicate that businesses highly appreciate the state's role, with an average score of over 4.0. The role in developing the digital transformation ecosystem is considered the most crucial. Recommendations are made for both enterprises and the state to foster digital transformation. Limitations include sample size and geographic focus, with suggestions for future research.

Keywords: Digital transformation, Ecosystem, Enterprise, Policy, State Role.

1. INTRODUCTION

Digital transformation (DT) has become a novel approach for many enterprises to gain a competitive advantage in a dynamic and fiercely competitive market. Numerous organizations have adopted DT, positively impacting business performance (Xu et al., 2024; Guo & Xu, 2021; Chen et al., 2016). It has enhanced the growth of small and medium-sized enterprises (Curraj, 2018; Gigova et al., 2019). The integration of digital technologies and the Internet has fundamentally altered market operations, leading to cost reductions, improved efficiency, and the creation of new market opportunities (Chen, 2020). Digital applications provide innovators and entrepreneurs with new boundaries to create and capture value (Nambisan et al., 2019) and boost entrepreneurial intent (Monllor & Soto-Simeone, 2019).

Despite the evident benefits of digital transformation, particularly for small and micro-enterprises (Reuschke et al., 2021; Chang, 2017), various barriers inhibit their ability to adopt and implement these technologies. These challenges manifest differently across industries, organizational cultures, and national contexts, and have been categorized into technical, regulatory, data, organizational, cultural, economic, and financial challenges (GIRI, 2019). The key factors identified by the author to overcome these barriers and facilitate the digital transformation of businesses include external factors (such as capital resources, government policy regulations, and industry-related environmental factors) and internal factors (including IT systems and customer collaboration). Among these, the role of the state is particularly significant. The government can create an enabling environment for digital transformation through targeted policies, financial support, and infrastructure development. By addressing regulatory challenges and providing resources for technology adoption, the state can significantly influence the pace and success of digital transformation initiatives. Despite existing research that underscores these points, a notable gap persists, with a predominant focus on urban centers or nationwide analyses, neglecting a nuanced comprehension of the government's impact on digital transformation within businesses, particularly in underdeveloped provinces poised for significant economic advancement. This study established theoretical frameworks concerning the state's involvement in digital transformation for Vietnamese enterprises, aiming to shed light on the specific dynamics and challenges faced in these contexts, thereby contributing to a more comprehensive understanding of the subject. The study aims to answer the two main questions:

1. What role does the state play in influencing digital transformation in Vietnamese businesses, and how?
2. What solutions can maximize the state's role in supporting the digital transformation of Vietnamese enterprises?

Through this exploration, the study aims to provide insights that can enhance the effectiveness of government interventions and facilitate a smoother transition into the digital age, ensuring that all enterprises can harness the benefits of digital technologies and contribute to the overall economic development of Vietnam. The results suggest a favorable reception from enterprises towards the State's endeavors in establishing a supportive atmosphere for digital transformation (DT) through transparent legal structures, cutting-edge technological infrastructure, support for workforce training, and financial assistance. This insight deepens the understanding of these dynamics by contextualizing them within a specific provincial framework, thus addressing a notable research gap identified in previous works focused predominantly on national or metropolitan contexts.

The following sections of this article are arranged in the following manner: Section 2 furnishes an extensive overview of the previous studies that precede the hypotheses, Section 3 furnishes an in-depth explanation of the research's theoretical framework, Section 4 showcases research methodology along with a comprehensive

description of the data utilized in the study, Section 5 showcases the empirical results, and Section 6 encapsulates the study's discussion and conclusion.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Literature Review

Vietnamese enterprises are mainly engaged in assembly activities within global value chains. Nguyen et al (2022) research has shown that investments in upstream sectors like textiles, agriculture, and wood products are necessary to increase added value. However, these activities face challenges such as technological upgrades, knowledge capital, and recruiting tech-savvy labor, which can only be overcome through leveraging technology transfer and knowledge exchange with multinational corporations. Process innovation also remains limited, as automation and technological advancements are lacking (Pham & Matsunaga, 2019). Large corporations have more resources and sufficient capabilities for innovative creativity compared to small and medium-sized enterprises (Ramilo & Embi, 2014).

A significant study conducted by Quyet Chu Ba (2021) identified seven factors influencing successful digital transformation in Vietnamese businesses, ranked in decreasing order of influence: (i) Government policies and support; (ii) Business information security; (iii) Digitization processes; (iv) Business digital transformation strategy; (v) Business workforce; (vi) Organizational structure and business processes; and (vii) Online customer support services. Meanwhile, in a study by Hung Trinh Xuan (2021), it was found that the factor "Organizational innovation in digital business" had the greatest impact on readiness for digital transformation, followed by "people and corporate culture," "platform business models," and "disruptive technologies." Similarly, a recent study by Huong Nguyen Thi Mai and Sen Bui Thi (2021) used regression analysis based on survey data from 97 SMEs in Hanoi to identify factors influencing the intention to implement digital transformation in SMEs. The results revealed that factors such as the business's goals, digital transformation strategy, technology infrastructure, financial capacity, and technology utilization skills all play a significant role in shaping the intention to pursue digital transformation in SMEs. Further research by Ruly Wiliandri (2020) applied quantitative methods to identify key factors influencing digital transformation among micro, small, and medium enterprises during the COVID-19 pandemic in Indonesia. The study found that government orientation, digital technology, competition, customer behavior, IT infrastructure, employee skills, and financial strategies were critical determinants.

Current research highlights the multifaceted role of government in digital transformation, mainly assessing subjective and objective factors within developed provinces or conducted general research nationwide, leading to a lack of specific in-depth assessment of the role of the state in digital transformation within companies, especially in less developed provinces with high economic growth potential, such as Vinh Phuc. Addressing this research gap is crucial for formulating effective government policies that enhance the state's role in digital transformation, thereby improving business operations and fostering overall economic development across all provinces facing similar conditions. Expanding the scope of research to include these regions will provide valuable insights and a robust theoretical foundation for implementing solutions tailored to the unique challenges faced by enterprises in various local contexts.

2.2. Theoretical Framework

Based on the study by Tarute and colleagues (2018) aimed to identify the determinants of digital transformation (DT) for small and medium-sized enterprises (SMEs), the authors conducted a systematic literature review to analyze existing knowledge on the factors influencing DT. The study categorized these factors into two groups: external and internal. External factors include financial resources, government policies, and industry environmental factors. Internal factors encompass information technology systems, human resources (HR), and customer collaboration.

2.2.1. The Role of Policy Planning in Digital Transformation

Coercive pressures, such as legal threats, can drive companies to adopt specific behaviors (Meyer, J., & Rowan, B., 1977). In this context, government pressure is a significant motivator prompting companies to engage in sustainability initiatives. Porter and Van Der Linde (1995) argue that companies engage in green activities to comply with increasingly stringent environmental regulations. Zhu, Kraemer, and Xu's (2006) study shows that the economic environment influences innovation synchronization, with the legal environment being more critical in developing countries than in developed ones.

2.2.2. The Role of the State in Financial Support in Digital Transformation

Digital transformation projects often require significant investment, while SMEs' financial capacity is limited. They also face difficulties in accessing foreign financial sources (World Bank, 2021). Therefore it is the State's policies and financial mechanisms, as highlighted by Dao My Chi (2022), Nguyen Ngoc Hung (2022), and Chu Ba Quyet (2021), that are instrumental in fostering digital transformation. These policies encompass various forms of financial incentives and support mechanisms for businesses embarking on digital transformation journeys. From avenues such as loans to tax incentives, the government implements measures aimed at encouraging and facilitating financial backing for enterprises engaged in digital transformation initiatives.

2.2.3. The Role of the State in Training Support

The government can support small service enterprises in enhancing their digital capabilities through training for owners and managers. Enhancing digital skills is a crucial factor driving innovation, affecting the ability to develop new products to meet customer needs (Khin & Ho, 2018). Additionally, the government can help build digital training systems for employees, reducing recruitment and training costs (C. Chen et al., 2021).

2.2.4. The Role of the State in Building a Digital Transformation Ecosystem Among Enterprises

The government plays a pivotal role in nurturing a collaborative Digital Transformation Ecosystem among enterprises. As businesses become increasingly interdependent in the digital transformation journey the task of restructuring the ecosystem to serve digital services is too complex for manufacturers (Coreynen et al., 2020; Gebauer et al., 2020). In adapting to digital servitization, manufacturers must seek out strategic partners to complement their capabilities and bridge digital service gaps effectively (Grandinetti et al., 2020). Therefore, the government's role in fostering this collaborative ecosystem extends to creating an environment conducive to cooperative endeavors centered around sharing knowledge, resources, marketing innovations, and product/service innovations.

2.2.5. The Role of the State in Investing in Digital Infrastructure for Enterprises

C. Chen and colleagues (2021) pointed out that small service enterprises need more funding and digital capabilities to build their digital platforms. Third-party platforms are often unavailable due to low profitability. The government can support small enterprises in developing digital platforms to promote digital transformation. The government could also encourage the use of digital tools such as e-commerce and social media, helping businesses find tools that align with their products and goals.

2.2.6. The Role of the State in Managing Digital Transformation Activities and Promoting E-Commerce

The government also plays a vital role in overseeing digital transformation initiatives by safeguarding intellectual property rights related to innovative technologies developed by businesses. Additionally, governmental responsibilities extend to managing and securing the technological frameworks that businesses employ, along with ensuring the security of electronic commerce operations. For example, small enterprises rely mainly on government initiatives that promote safety regulations and payment security certifications to increase trust and transaction volumes (C. Chen et al., 2021).

3. MODELS AND RESEARCH HYPOTHESES

3.1. The Role of the State in Formulating Digital Transformation Policies

The state plays a crucial role in establishing policies for digital transformation, which includes setting specific regulations to synchronize and enhance the effectiveness of digital transformation for government agencies, enterprises, and citizens (Dao My Chi 2022; Cisco 2019). The government enacts laws that guide digital transformation activities within businesses, delineating rules for digital transactions and promoting compliance through incentives and regulatory pressure.

H₁: The Government's Role in Policy Formulation for Digital Transformation Positively Influences Enterprise Digital Transformation Activities.

3.2. The State's Role in Financial Support for Enterprises in Digital Transformation Efforts

According to Chen et al. (2021) and Cisco (2019), financial support, particularly in terms of interest rates and credit, is a vital tool for the state in economic development and in fostering digital transformation among enterprises, especially small and medium-sized enterprises (SMEs), through incentive policies and support for research and development initiatives related to digital transformation.

H₂: The Government's Role in Financial Support for Digital Transformation Positively Influences Enterprise Digital Transformation Activities.

3.3. The State's Role in Training and Human Resource Development for Enterprises in Digital Transformation

Supporting training and the development of human resources for SMEs during their digital transformation is a significant function of the state, aimed at enhancing capabilities and sourcing skilled labor (Chen et al., 2021; Cisco 2019). Current support includes training initiatives focused on digital transformation awareness for business owners and employees, organizing digital transformation systems, and offering training courses from central and provincial authorities.

H₃: The Government's Role in Supporting Training and Human Resource Development Positively Influences Enterprise Digital Transformation Activities.

3.4. The State's Role in Building a Digital Transformation Ecosystem Among Enterprises

To facilitate digital transformation in businesses, the state implements policies aimed at creating a digital transformation ecosystem (Chen et al., 2021; Cisco, 2019). Establishing such an ecosystem among enterprises promotes a digital business environment that encourages collaboration and technology sharing (Sawy et al., 2016). This initiative boosts competitiveness, enhances production and service efficiency, and lowers costs related

to technology research and development.

H₄: The Government's Role in Building a Digital Transformation Ecosystem Among Enterprises Positively Influences Enterprise Digital Transformation Activities.

3.5. The State's Role in Investing in Digital Infrastructure for Enterprises Engaged in Digital Transformation

The state plays an essential role in investing in digital infrastructure to promote digital transformation for businesses (Chen et al. 2021; Cisco 2019). This investment boosts business competitiveness and provides enterprises, particularly SMEs, with better access to new technologies. Digital infrastructure enhances products, services, and processes while improving flexibility and connectivity with customers through advanced digital technologies.

H₅: The Government's Role in Investing in Digital Infrastructure for Enterprises Positively Influences Enterprise Digital Transformation Activities.

3.6. The State's Role in Performing Management and Oversight Functions to Ensure Safety in Digital Transformation Activities and Promote E-commerce Among Enterprises

According to Nadeem et al. (2018), digital transformation significantly impacts various sectors, including healthcare, telecommunications, automotive, banking, and manufacturing. The degree of digital transformation is contingent upon the industry, consumer demand, technology application, leadership position, and company size. The state supports the protection of intellectual property, manages technology security, and encourages e-commerce platforms that connect customers with enterprises and payment entities.

H₆: The Government's Role in Performing Management and Oversight Functions to Ensure Safety in Digital Transformation Activities and Promote E-commerce Positively Influences Enterprise Digital Transformation Activities.

4. RESEARCH METHODOLOGY

This study uses a combination of qualitative and quantitative research methods to collect multidimensional data on the influence of the role of the State on business digital transformation activities. This combination enhances the accuracy and reliability of the research results.

4.1. Qualitative Research Method

The qualitative research method was used to explore the state's role in influencing enterprises' digital transformation activities. The study model was based on the fully developed acceptance model, which aimed to identify influencing factors and observable variables requiring measurement. Subsequently, the model and scales were adjusted through expert consultations and in-depth interviews with relevant stakeholders, including enterprises's employees, managers, directors, and government officials. This process helped clarify the State's roles in impacting the digital transformation of businesses and adjusted the research model to fit the context.

4.2. Quantitative Research Method

The quantitative research method was implemented through a survey using a questionnaire designed based on the results of the qualitative research. The questionnaire was constructed using measurement scales validated in reputable journals, ensuring that the questions were clear and easy to understand. The sample size was determined based on the larger of the two minimum sample sizes required for conducting Exploratory Factor Analysis (EFA). According to Hair et al. (2018), the minimum sample size for using EFA is 50, though a sample size of 100 or more is preferred. The ratio of observations to each analyzed variable is 5:1, but ratios of 15:1 or 20:1 are preferred. Therefore, the minimum sample size required for EFA analysis would be $10 \times 31 = 310$ observations. The larger the sample size, the lower the error in estimates and the higher the representativeness of the population. Since this study focused on the opinions of managers, responses from other sources were excluded from the final dataset. Of the 395 survey responses collected, the author recorded 200 from small-sized enterprises and 195 from medium-sized enterprises. After data collection, the author proceeded with data cleaning, followed by data analysis according to the research objectives and hypotheses. The author utilized SPSS 22 and AMOS software to analyze, statistically process, and manage the data.

5. RESEARCH RESULTS

5.1. Reliability Assessment of the Measurement Scales Using Cronbach's Alpha Reliability Analysis of Independent Variable Scales

According to Nunnally (1978) and Hair et al. (2010), a reliable scale should ideally exhibit a Cronbach's alpha of 0.7 or higher. While Hair et al. (2010) acknowledge that a Cronbach's alpha of 0.6 might be acceptable in exploratory research, a higher alpha indicates greater reliability. Another important indicator is the Corrected Item-Total Correlation, which reflects the correlation between each observed variable and the others in the scale. A stronger positive correlation between an observed variable and the rest of the scale indicates a higher Corrected Item-Total Correlation and a better-performing variable. Cristobal et al. (2007) suggest that a good scale should have corrected item-total correlations of 0.3 or higher for its observed variables. Therefore, since all observed variables met these criteria, they were deemed suitable for inclusion in subsequent analyses.

The dependent variable scales in the study were assessed for reliability using Cronbach's Alpha procedure.

The independent variable scale, which measures digital transformation activities within enterprises, was evaluated through observable variables. All observable variables had item-total correlation coefficients greater than 0.6, and Cronbach's Alpha coefficient was 0.86. According to Nunnally (1978), a good scale should have a Cronbach's Alpha reliability of 0.7 or higher. Hair et al. (2010) also argued that a scale ensuring unidimensionality and reliability should meet the threshold of Cronbach's Alpha at 0.7 or above; however, for exploratory research, a Cronbach's Alpha threshold of 0.6 may be acceptable. A higher Cronbach's Alpha coefficient indicates greater reliability of the scale. Another important metric is the Corrected Item-Total Correlation, which reflects the correlation between each observable variable and the remaining variables in the scale. The stronger the positive correlation between an observable variable and other variables in the scale, the higher its Corrected Item-Total Correlation, indicating better performance of that variable. Cristobal et al. (2007) stated that a good scale should have observable variables with Corrected Item-Total Correlation values of 0.3 or higher. Thus, all observable variables meet the requirements for further analysis.

5.2. Exploratory Factor Analysis (EFA)

5.2.1. Exploratory Factor Analysis (EFA) of Independent Variables

The validity of the scale was evaluated using Exploratory Factor Analysis (EFA). According to Hair et al. (2010), the factor loading serves as a criterion to ensure the meaningfulness of EFA establishment:

- Factor loading at ± 0.3 : The minimum condition for retaining an observable variable.
- Factor loading at ± 0.5 : The observable variable has good statistical significance.
- Factor loading at ± 0.7 : The observable variable has very high statistical significance.
- KMO coefficient (Kaiser-Meyer-Olkin): $0.5 < \text{KMO} < 1$.

The exploratory factor analysis of the observable variables produced favorable results, with a KMO coefficient of $0.918 > 0.5$ and a significance value of $\text{Sig} = 0.000$, indicating the high reliability of the exploratory factor analysis. The total variance explained by the sixth factor was 67.879%, and the eigenvalue of this factor was $1.509 > 1$. Therefore, the factors adequately represent the original survey data.

The exploratory factor analysis of the independent variables yielded similar results, with a KMO coefficient of $0.860 > 0.5$ and $\text{Sig} = 0.000$, demonstrating high reliability. The total variance explained by the sixth factor was 7.5298%, and the eigenvalue of this factor was $1.409 > 1$. Thus, the factors ensured their ability to represent the original survey data.

5.3. Confirmatory factor analysis (CFA)

5.3.1. Confirmatory Factor Analysis (CFA)

The confirmatory factor analysis (CFA) results indicate that all factors included in the model demonstrated an acceptable fit.

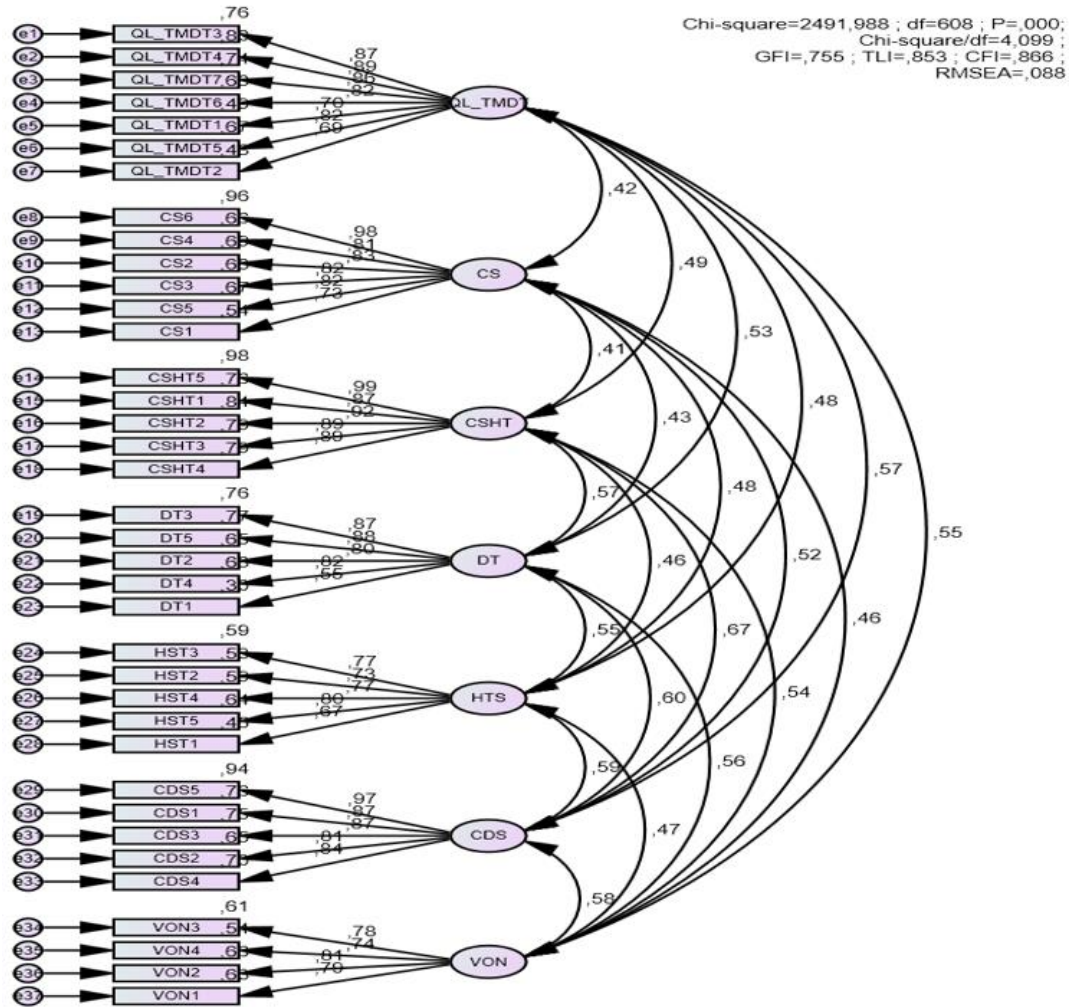


Figure 1. Confirmatory Factor Analysis (CFA) Results.

Factor loadings exceeded 0.5, consistent with Hair et al. (2010), who recommend retaining observed variables with standardized beta coefficients of at least 0.5, ideally 0.7 or higher.

Table 1: Standardized Beta Coefficients from the CFA Model.

		Standardized Beta Coefficient				Standardized Beta Coefficient	
QL_TMDT3	<---	QL_TMDT	0.873	DT5	<---	DT	0.876
QL_TMDT4	<---	QL_TMDT	0.892	DT2	<---	DT	0.803
QL_TMDT7	<---	QL_TMDT	0.863	DT4	<---	DT	0.824
QL_TMDT6	<---	QL_TMDT	0.823	DT1	<---	DT	0.552
QL_TMDT1	<---	QL_TMDT	0.7	HST3	<---	HTS	0.768
QL_TMDT5	<---	QL_TMDT	0.82	HST2	<---	HTS	0.729
QL_TMDT2	<---	QL_TMDT	0.694	HST4	<---	HTS	0.77
CS6	<---	CS	0.982	HST5	<---	HTS	0.797
CS4	<---	CS	0.811	HST1	<---	HTS	0.673
CS2	<---	CS	0.83	CDS5	<---	CDS	0.968
CS3	<---	CS	0.823	CDS1	<---	CDS	0.87
CS5	<---	CS	0.816	CDS3	<---	CDS	0.867
CS1	<---	CS	0.732	CDS2	<---	CDS	0.808
CSHT5	<---	CSHT	0.988	CDS4	<---	CDS	0.835
CSHT1	<---	CSHT	0.872	VON3	<---	VON	0.778
CSHT2	<---	CSHT	0.919	VON4	<---	VON	0.737
CSHT3	<---	CSHT	0.89	VON2	<---	VON	0.814
CSHT4	<---	CSHT	0.889	VON1	<---	VON	0.793
DT3	<---	DT	0.871				

The variables in the model are all correlated with each other, see Table 5.

Table 2. Relationships between variables in the model.

			Estimate	S.E.	C.R.	P			Estimate	S.E.	C.R.	P	
QL_TMDT	<->	CS	0.145	0.02	7.34	***	CS	<->	VON	0.133	0.018	7.467	***
QL_TMDT	<->	CSHT	0.186	0.022	8.34	***	CSHT	<->	DT	0.22	0.024	9.288	***
QL_TMDT	<->	DT	0.172	0.021	8.39	***	CSHT	<->	HTS	0.146	0.02	7.435	***
QL_TMDT	<->	HTS	0.13	0.018	7.41	***	CSHT	<->	CDS	0.257	0.024	10.815	***
QL_TMDT	<->	CDS	0.189	0.02	9.28	***	CSHT	<->	VON	0.17	0.02	8.366	***
QL_TMDT	<->	VON	0.148	0.018	8.16	***	DT	<->	HTS	0.15	0.019	8.091	***
CS	<->	CSHT	0.166	0.022	7.46	***	DT	<->	CDS	0.2	0.021	9.504	***
CS	<->	DT	0.149	0.02	7.36	***	DT	<->	VON	0.153	0.019	8.242	***
CS	<->	HTS	0.139	0.018	7.67	***	HTS	<->	CDS	0.165	0.019	8.874	***
CS	<->	CDS	0.182	0.02	8.93	***	HTS	<->	VON	0.107	0.015	6.954	***
							CDS	<->	VON	0.161	0.018	8.787	***

The coefficients in the model CMIN/df = 4.099 are acceptable; GFI = 0.755 is good, CFI = 0.866 is very good, CFI ≥ 0.8 is acceptable TLI = 0.853 is good and RMSEA = 0.088 is acceptable. The variables were included in the SEM analysis.

5.4. Linear Structural Model of the Role of the State in the Digital Transformation of Enterprises

The SEM model results are shown in Figure 2.

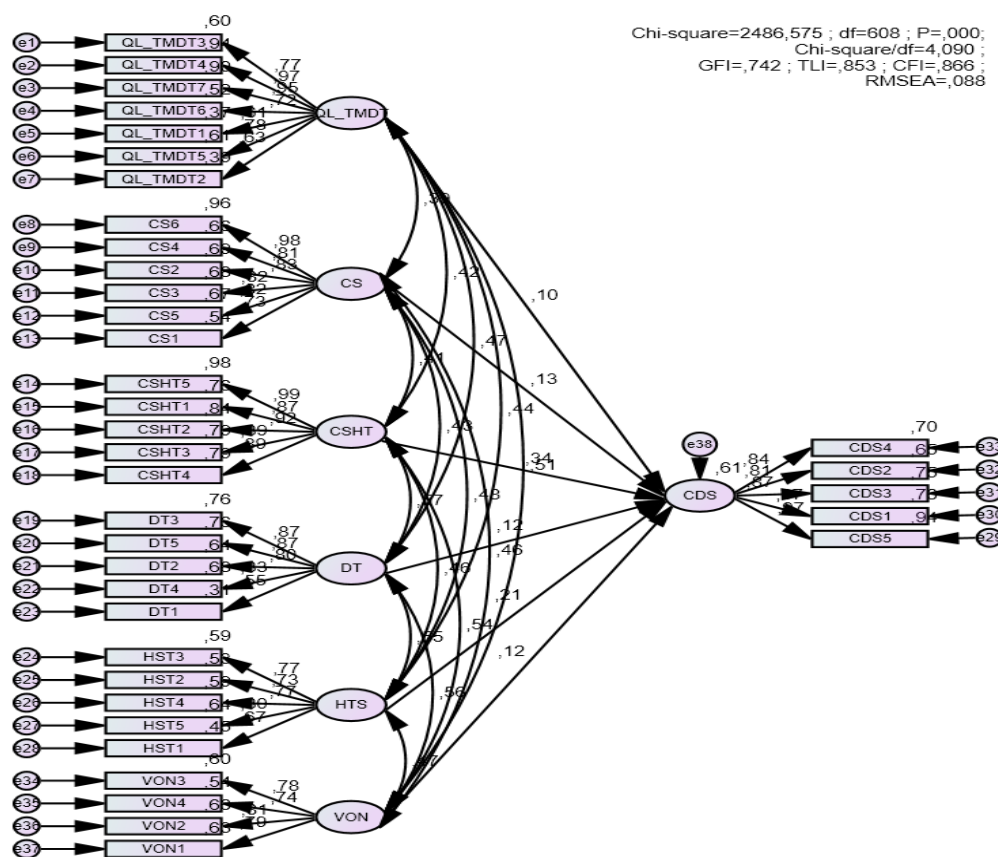


Figure 2: SEM model results.

Table 3. Impact of the Role of the State on Digital Transformation Activities in Enterprises.

Factor			Unstandardized Beta Coefficient	Standardized Beta Coefficient	S.E.	C.R.	P
CDS	<--	QL_TMDT	0.120	0.104	0.049	2.452	0.014
CDS	<--	CS	0.125	0.131	0.040	3.138	0.002
CDS	<--	CSHT	0.294	0.338	0.039	7.488	***
CDS	<--	DT	0.121	0.119	0.052	2.326	0.020
CDS	<--	HTS	0.252	0.207	0.060	4.194	***
CDS	<--	VON	0.151	0.124	0.063	2.397	0.017

The findings reveal that the state's role has a positive effect on the digital transformation efforts of enterprises, with all aspects of this role showing a statistically significant impact. Thus, the role of the state is crucial to enterprises undergoing DT in the country's current socio-economic conditions.

6. DISCUSSION AND CONCLUSIONS

6.1. Discussion

By analyzing the level of agreement among enterprises regarding the State's role in various aspects of DT, the author presents several important observations as follows:

Role of Policy Making: The results show that the State's role in issuing and amending legal regulations on DT is highly appreciated by enterprises. This consensus not only reflects the trust of enterprises in the State's strategic orientation capabilities but also emphasizes the importance of a favorable legal environment in promoting DT. However, to maintain and enhance the effectiveness of policies, the State needs to continuously monitor and adjust regulations promptly to meet practical requirements and address difficulties that enterprises may encounter during the DT implementation process.

Role of Supporting Technological Infrastructure: The results also highlight the importance of technological infrastructure in promoting DT. Enterprises highly appreciate the State's efforts in upgrading 5G networks, fiber optics, and other information systems. However, building a synchronized and modern technological infrastructure requires significant investment from the State, especially in developing online services and management systems. To achieve maximum efficiency, there needs to be close coordination between State agencies and enterprises in the deployment and operation of this technological infrastructure.

Role of Financial Support: The State's role in providing financial support, particularly through preferential loans and credit policies, has been positively evaluated by enterprises. However, there are still challenges, especially for SMEs in accessing capital. To address this issue, the State needs to continue improving financial policies, ensuring transparency and ease of access for enterprises, particularly small-scale ones.

Role of Supporting Training and Human Resource Development: The State's support in training and developing human resources for DT is considered one of the key factors in promoting sustainable DT. The research results show that enterprises highly appreciate the training programs and support for enhancing DT expertise organized by the State. However, to improve the effectiveness of these programs, the State needs to focus on designing training courses that meet the specific needs of enterprises and enhancing interaction between enterprises and training agencies.

Role of Building a Digital Transformation Ecosystem: Building a linked ecosystem among enterprises in DT is also highly valued. Cooperation and technology sharing among enterprises not only help save costs but also create new opportunities for development and innovation. The State needs to continue encouraging and supporting enterprises in building and participating in these ecosystems to promote sustainable development in the context of global DT.

Role of Managing, Supervising, and Ensuring Safety for DT Activities: Finally, the State's role in managing, supervising, and ensuring safety for DT activities is also positively evaluated. The State has played an important role in ensuring cybersecurity and supporting e-commerce, especially in managing and securing the technology platforms used by enterprises. However, in the context of continuously evolving technology, the State needs to keep updating policies and regulations to ensure safety and security for enterprises during the DT process.

6.2. Contributions

6.2.1. Theoretical Contributions

This study expands the theory on the role of the State in the digital transformation of enterprises, elucidating the interaction between state policies and enterprise development. The findings indicate that in the context of digital transformation, the State performs the following roles: (i) the State acts as a policy maker for digital transformation; (ii) the State provides financial support to enterprises for digital transformation activities; (iii) the State supports training and human resource development; (iv) the State builds a digital transformation ecosystem linking enterprises; (v) the State invests in digital infrastructure for enterprises to use; (vi) the State performs the functions of managing, supervising, ensuring safety for digital transformation activities, and promoting e-commerce.

6.2.2. Practical Contributions

Practically, the study provides specific solutions and recommendations for enterprises and the State to enhance the effectiveness of digital transformation activities in enterprises. It focuses on developing policies that create a digital transformation ecosystem for enterprises. At the same time, enterprises need to focus on training high-quality human resources and improving advanced infrastructure. These recommendations not only help enterprises but also fully leverage the role of the State in digital transformation within enterprises in Vinh Phuc province.

6.3. Recommendations

6.3.1. Firstly, the National Digital Transformation Committee Should be Established

Establish the National Digital Transformation Committee led by the Prime Minister, including the Minister of Information and Communications along with other ministers and experts in digital transformation. The tasks include: directing action plans, guiding and inspecting implementation, approving amendments to proposals, evaluating results, promoting inter-sectoral cooperation, addressing strategic issues, and ensuring budget allocation. The Ministry of Information and Communications will act as the standing agency, monitoring and reporting on the implementation status.

6.3.2. Secondly, the Responsibilities of Ministries, Sectors, and Localities

First, advocate for the goals and objectives of the Telecommunications Planning at the local level. Second, passive telecommunications infrastructure planning should be developed and implemented to align with both national telecommunications development strategies and local plans. The plans must ensure the achievement of digital transformation goals, detail tasks suitable to specific conditions, and establish key performance indicators (KPIs) to assess progress.

Ministries need to organize annual Digital Transformation Forums to create opportunities for dialogue between the National Digital Transformation Committee and stakeholders. They must also coordinate with the Ministry of Information and Communications to build a secure national information network, manage information security, and allocate frequency bands.

Additionally, it is necessary to control telecommunications equipment, support enterprises in research and product development, and facilitate overseas investment. Coordination in key investment projects and the establishment of specific financial mechanisms are also crucial. The government requires strict implementation of the Telecommunications Law 2009 and the Telecommunications Planning 2025–2030, while guiding provinces to develop appropriate telecommunications infrastructure planning.

6.3.3. Thirdly, recommendations for the People's Committee of Vinh PHUC Province

First, the goals and principles of telecommunications planning should be promoted locally. Second, passive telecommunications infrastructure plans should be consistent with both national and local telecommunications development strategies. Third, periodically prepare and adjust passive telecommunications infrastructure planning every five years, integrating this content into detailed traffic and construction planning. Fourth, coordinate with the Ministry of Information and Communications to underground and beautify telecommunications cables. Finally, manage the shared use of telecommunications infrastructure and promptly address violations during the area's construction and use of infrastructure.

6.4. Conclusion

This study provides an in-depth insight into the role of the State in promoting digital transformation (DT) activities among small and medium-sized enterprises (SMEs) in Vinh Phuc Province. The findings reveal that the State's efforts in creating an enabling environment for DT have been positively perceived by enterprises, echoing earlier research by Chu Ba Quyet (2021) on the pivotal role of government in DT. By delving into these dynamics at a localized level, this study offers valuable insights into the nuanced interplay between governmental initiatives and enterprise perceptions, providing a more holistic perspective on the impact of state interventions on digital transformation within specific regional contexts, effectively bridging a crucial research void that had been observed in prior studies primarily concentrated on national or urban scenarios.

Although this study offers valuable contributions, several limitations need to be considered. Firstly, the research sample is confined to specific geographical and demographic areas, which may only partially represent the diverse consumer base in other regions or contexts. Secondly, data collection primarily relies on self-reported questionnaires, which may introduce subjective bias from respondents.

Future research should focus on expanding the sample size and geographical scope to enhance the generalizability of the results. Additionally, employing diverse data collection methods, such as experimental designs or in-depth interviews, could provide a more comprehensive understanding of the role of the State in digital transformation (DT) within enterprises in Vinh Phuc province. Finally, assessing the impact of the State's role in DT on the policies and development directions of enterprises will contribute to continuous improvement and a deeper understanding of this research area. By addressing these limitations and building on the findings of this study, future research can further advance the field.

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