FACTORS AFFECTING DIGITAL TRANSFORMATION ABILITY OF ENTERPRISES: A CASE STUDY OF THANH HOA PROVINCE

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Abstract: *Digital transformation has been considered as an urgent mission of businesses to improve competitiveness in the current period. However, the level and quality of digital transformation of enterprises depend on various factors. The study examines 5 factors impacting on the digital transformation capacity of enterprises in Thanh Hoa province, including: Leadership, Staff capacity, Technology Platform, Corporate culture and Pressure on Business. Utilizing multiple regression analysis on the survey of 200 enterprises in Thanh Hoa province, the result indicates that Staff capacity and Technology platform have the strongest effect on digital transformation ability.*

Keywords: *Digital transformation, technology, businesses.*

1. Introduction

Digital transformation is a significant focus for governments, businesses, and scientific research alike. It involves a series of activities that elevate digitization to establish innovative operational methods. Based on this information, digital transformation progresses through three stages: digitization, digital application, digital operations, and digital transformation. Theoretical studies often concentrate on enterprises' strategies for digital transformation such as Zinder & Yunatova (2016), Hess et al. (2016). Additional research delves into comprehending the elements influencing the digital transformation journey such as those of Ta & Lin (2023). In practice, digital transformation is inevitable, but not all businesses are successful. Some of the pioneers in digital technology have become powerful enterprises by transforming their operating models, better meeting customer needs, and managing resources more efficiently. However, in Vietnam, most businesses are struggling because they still have many drawbacks: weak financial problems, information leakage, broken supply chains, lack of synchronization of infrastructure factors. Moreover, the digital transformation process is very different from different businesses, it depends a lot on factors both inside and outside the business.

In Thanh Hoa, mission of digital transformation activities is to put businesses and people at the center of community activities towards the goal: the digital economy accounts for 30% or more of the province's GRDP, digital transformation businesses accounts for more than 80% of the total number of taxable enterprises (Thanh Hoa

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Department of Information and Communications, 2021). To achieve that, businesses need to have specific strategies. Through the survey, currently the demand for digital transformation in enterprises is very large. Thanh Hoa currently has more than 27,000 registered businesses, of which nearly 21,000 are operating and generating revenue. However, up to 60% of businesses are facing barriers in technology, capital and human resources for digital transformation. Therefore, to be successful in digital transformation, businesses need to grasp the factors that mainly affect their digital transformation capabilities; then make appropriate adjustments to achieve the goal.

2. Literature Review

Technology is always changing the way businesses operating. Companies are starting to look for easy ways to carry out digitization projects so they can keep up with their competitors and delight their customers (Becker et al; 2002). It can be seen that there are tons of concepts of digital transformation in businesses. According to Vietnam Business Development Department (2021), the concept of digital transformation is formed by the amalgamation of information technology environments, individuals and businesses and encapsulates the transformational impact of new digital technologies such as social technology, mobility, analytics, cloud and Internet of things.

According to the Ministry of Information and Communications of Viet Nam (2009), digital transformation is the process of shifting from a traditional organizational governance model to a digital organization by applying new technologies such as big data (Big Data), the Internet for things (IoT), cloud computing (Cloud) to change operating methods, leadership, work processes, and organizational culture. Digital transformation in enterprises is the application of technology platforms to replace traditional forms of operation in order to gain advantages such as quality, cost, speed and operational flexibility (Lederer et al;., 2017).

The digital transformation of enterprises consists of three issues. The first is to transfer change operating procedures. Building and using an electronic data exchange system will help businesses save time and be more efficient. The second is to change the operating model, that is to change the way operate to create value for the business. Finally, change the customer experience, which is the result of interactions between customers and businesses that customers experience and feel (Hinchcliffe, 2017).

According to Reis et al. (2018) and Li et al (2018), digital transformation of enterprises goes through 3 stages. Phase 1 is orientation strategy. In this period, businesses need to take advantage of technology solutions to enhance the experience customers to achieve their goals. Businesses often use available or easily accessible resources at a reasonable cost and in line with the enterprise's ability to deploy. Phase 2 is digital transformation business model. At this stage, businesses focus on applying digital technology on a large scale, with connections between functions. This stage often focuses on changing the governance model to bring optimal efficiency in running the business.

Phase 3 is the digital transformation of management capacity. This era signifies a profound shift towards comprehensive digital transformation, emphasizing the interconnected and synchronized integration of business systems and corporate governance. Information will be shared across departments and over time real. Digital transformation of management capacity will help businesses manage and implement saving activities more and more efficient.

3. Theoretical Framework

Lanzolla & Anderson (2008) emphasize the application of digital technologies as a driver of digital transformation. Digital technologies can include big data, mobile, cloud computing or search-based applications (White, 2012). Another point of view, Chatterjee et al. (2023) argues that for successful digital transformation, leaders must believe in the value and benefits of new technologies and support their implementation in their operations. Also from this point of view, Hess et al. (2016) emphasized the role of the human factor in promoting transformation processes, there should be a match between human capacity and digital technology applications.

Nadkarni and Prugl (2021) synthesized from previous studies and found that internal factors affecting the digital transformation ability of enterprises are divided into 3 groups: 33% focus on technology, 34% focus on organization organization and 33% focus on both technology and organization. In studies focused on organizations, four frequently cited factors that directly influence the outcomes of enterprises' digital transformation are: (1) leadership, (2) workforce capabilities, (3) corporate culture, and (4) business environment pressures. Technology-focused research emphasizes the impact of technology platforms on business operations-such as data storage, customer interaction, internal communication, and other activities-on enterprise digital transformation. This element is referred to as (5) technology platform in the study.

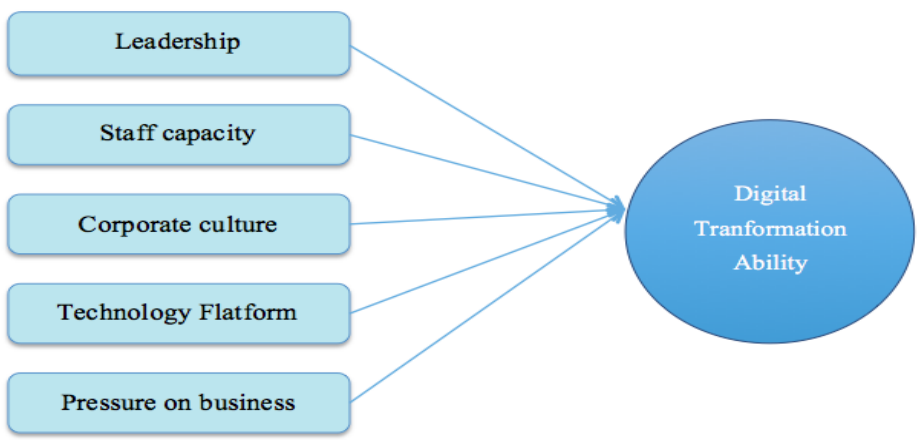

Diagram1. *Research model proposed*

***Leadership*:** The shift in leaders' mindset and behaviors significantly impacts enterprises' capacity for digital transformation. If the leaders understand the benefits that digital transformation that brings to businesses, they will be willing to accept to invest resources in digital transformation such as financial or human resources (Alshamaila et al., 2013). Previous studies have also suggested that leadership support in digital transformation is extremely important for securing the necessary resources for the digital transformation process. Lack of leadership support will easily lead to digital transformation failure (Grandon & Pearson, 2004). Therefore, the author hypothesizes:
H1: Leadership has positive impact on digital transformation ability

***Staff capacity*:** For employees and management levels, there is a need for a process to perform operations with speed, accuracy and efficiency when digital transformation. Therefore, employees must be competent, ready to access, develop and use new technologies in improving and performing work. Moreover, depending on business conditions, employees as well as managers must develop the ability to feel and be flexible in exploiting different networks and interconnectedness in a digital environment (Daniel & Wilson, 2003). Therefore, the author hypothesizes:
H2: Staff capacity has positively impact on digital transformation ability

Corporate culture: Digital transformation necessitates a corporate culture characterized by continual validation and sharing (Dremel et al., 2017). This entails fostering transparency in workflow and business operations, as well as promoting a data-centric mindset among employees. Furthermore, digital transformation may lead to cultural clashes between tech-savvy yet inexperienced younger employees and older employees with extensive experience in traditional business practices but a lag in technology adoption (Kohli & Johnson, 2011). Therefore, the author hypothesizes:
H3: Corporate culture has positively impact on digital transformation ability

***Pressure on Enterprise**:* These are the pressures that businesses must face if they want to survive and develop in the market (Oliveira et al., 2014). Low at al;, (2011) argues that the rapid changes in technology and the requirements of partners due to these changes make businesses tend to apply new technologies to maintain competitive advantages. Pressure is considered to have a positive effect on the ability to digitally transform, especially when digital transformation is part of a business's competitive strategy. Therefore, the author hypothesizes:
H4: Pressure on enterprises has positively impact on digital transformation ability

Technology Platform: Digital transformation will change job structure job roles and requirements in the workplace (White, 2012). Digital interoperability allows cross-site groups to appear across the entire enterprise. Within this framework, the conventional hierarchical work setup is steadily fading away, paving the way for fresh opportunities

that extend beyond the traditional confines of the enterprise (Loebbecke & Picot, 2015). According to White (2012), a digital workplace must be relevant, principled, imaginative and independent of the workplace. Thus, how well a business has a background in applying technology in its current operations will greatly affect its ability to successfully transfer arguments in the future. Therefore, the author hypothesizes:
H5: Technology Platform has positively impact on digital transformation ability

4. Research Methodology

In multiple regression analysis, the minimum sample size required is 50 + 8*m (where m represents the number of independent variables) (Tabachnick & Fidell, 1996). With 5 independent variables in this study, the minimum sample size needed is 90. To ensure reliability and conduct comprehensive analytical techniques, the study surveyed 200 enterprises using questionnaires distributed through Google Forms or direct methods.

In the 200 surveyed enterprises, 54.6% are small and micro enterprises, 28.7% are medium sized, and the rest are large enterprises. In the survey, 35.3% are commercial enterprises, 24% are industrial enterprises, and the rest are agricultural and service enterprises.

Following the evaluation of the scale using Cronbach's Alpha coefficient, the study conducts an analysis of exploratory factors to identify the elements influencing enterprises' digital transformation capabilities. Then, testing multiple regression models to measure the influence of those factors.

5. Study Results and Discussion

The scale of 5 independent variables is expressed through 16 observed variables and the scale of 1 dependent variable is expressed through 3 observed variables. Reliability test results by Cronbach's Alpha coefficient, Cronbach's Alpha values of the variables in the model range from 0.621 to 0.906, showing the consistency within the scale structure of each variable.

The model's KMO coefficient is 0.867, greater than 0.5, so factor analysis is appropriate, Sig value. = 0.000 in the Bartleet test is less than 0.05, so the observed variables are correlated with each other in terms of the population. This result shows that the observed variables of the scale explained 65.655% of the variation of the data. With the varimax rotation, all transmission coefficients are greater than 0.5 and the transfer coefficient difference between the two factors is less than 0.3. Thus, the scale of factors affecting the ability to convert digital has met the requirements of discriminant value and convergence properties.

The study examined the linear relationship between independent and dependent variables through single correlation coefficient analysis (Pearson). Findings indicate that the "digital transformation ability" is positively correlated with all independent variables, each showing a correlation coefficient exceeding 0 and statistical significance below 0.05. Moreover, no significant multicollinearity was observed among the independent variables. The regression results have R2 value of 0.525, proving that the independent and dependent variables have a relationship with 52.5% of the variation in digital transformation ability, which is explained by 5 factors in the model, the remaining 47.5% is explained by other factors. F value equals 37,504 with sig. less than 5%.

The regression analysis reveals that the five factors positively influencing enterprises' digital transformation ability demonstrate statistically significant results ($p < 0.05$). The relationship between the variables is depicted in the regression equation using the standardized Beta coefficient:

DTA = 0,194PE + 0,23SC + 0,193BC + 0,212TP + 0,20LS

Checking the defects of the regression model gives the results: Durbin - Watson coefficient is equal to 2.020, so the error part has no first-order autocorrelation; the variance exaggeration coefficient VIF of all variables is less than 2.1, so multicollinearity between variables is not significant; White's test has no cross product, the results show that there is no change in the variance of the error; Kolmogorow-Smirnow test shows that sig. greater than 0.05, so the residuals are normally distributed. Thus, it can be concluded that the regression function perfectly fits the data.

***Table 1**. Regression results with dependent variable "Digital transformation capability"*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-1.187	.338		-3.507	.001		
PE	.252	.080	.194	3.136	.002	.733	1.365
SC	.264	.073	.230	3.634	.000	.696	1.438
BC	.307	.094	.193	3.255	.001	.793	1.261
TP	.274	.082	.212	3.344	.001	.695	1.440
LS	.297	.091	.201	3.286	.001	.745	1.343

(Author's data processing results)

This result is consistent with previous studies because internal factors such as technology platform, leadership, staff capacity, corporate culture have significant impact

on the ability of enterprises to digitally transform (Kane et al., 2019). The development of technology have forced businesses to increase the application of technology, digitize data, and improve employees' digital working skills. Therefore, businesses have closed the gap in digital transformation capabilities. This is why business pressure emerges as a significant factor influencing digital transformation, as indicated in this study.

Furthermore, the findings highlight that employee capacity stands out as the paramount concern for successful digital transformation within businesses. This result is consistent with earlier studies (Kozanoglu and Abedin, 2021; Smimova et al;, 2019) that quality of employees make a crucial contribution to the successful digitalization. That is reason why human resources are always identified as a strategic competitive advantage.

In addition to this, the technology platform is one of the main agents of digital transformation for businesses in Thanh Hoa. This is similar to the results of AlNuaimi et al; (2022); Prause (2019); that indicate that technology basement is the premise to promote digital transformation. Different from other forms of operation, in order to be able to promote digital transformation, it is necessary to apply many technologies, storing and analyzing data, so it is important to ensure data security for the system. Technology compatibility has a positive effect on the digital transformation of businesses. The findings show that technology compatibility is the most important factor between new technology and enterprise's existing technology platform to realize digital transformation.

Leadership is the third factor that has strongest impacts on digital transformation capacity of businesses. This finding is similar to prior studies of leadership's influences on digital transformation (Yokoi et al., 2019). Successful digital transformation involves digital strategies that are oriented, planned and guided by leaders' efforts.

6. Conclusion

Digital transformation is inevitable and a mandatory requirement for businesses in any field to survive and develop. However, each business with different backgrounds and capabilities, to succeed in digital transformation, needs to be well aware of the factors affecting the ability to digitally transform, so that appropriate directions for improvement and innovation can be made in each case. specific stage of the process. The research results show that there are 5 factors affecting the digital transformation ability of enterprises, including: staff capacity, technology platform, pressure on business, leadership and corporate culture. For successful digital transformation, businesses in Thanh Hoa need to build a specific roadmap, in which staff capacity is a matter of concern and top priority. Organizations should establish effective human resource training and development strategies and be prepared to integrate technology platforms across all operational aspects, from management to execution. Moreover, leadership

plays a crucial role in guiding, fostering, and alleviating pressure within the organization, transforming challenges into motivational forces that drive individual and collective actions towards the digital transformation of the enterprise.

References

[1] AlNuaimi, B. K., Singh, S. K., Ren, S., Budhwar, P., Vorobyev, D. (2022), *Mastering digital transformation: The nexus between leadership, agility, and digital strategy*, Journal of Business Research, 145, 636-648.

[2] Alshamaila, Y., Papagiannidis, S., Li, F. (2013), *Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework*, Journal of Enterprise Information Management, 26, 250-275.

[3] Becker, J., P. Delfmann, R. Knackstedt, and D. Kuropka (2002), *Konfigurative Referenzmodellierung*, In J. Becker and R. Knackstedt, eds., Wissensmanagement mit Referenzmodellen. Physica-Verlag HD, Heidelberg, 25-144.

[4] Cetindamar Kozanoglu, D., Abedin, B. (2021), *Understanding the role of employees in digital transformation: Conceptualization of digital literacy of employees as a multi-dimensional organizational affordance*, Journal of Enterprise Information Management, 34(6), 1649-1672.

[5] Chatterjee, S., Chaudhuri, R., Vrontis, D., Giovando, G. (2023), *Digital workplace and organization performance: Moderating role of digital leadership capability*, Journal of Innovation and Knowledge, 8(1), 100334.

[6] Daniel, E. M., Wilson, H. N. (2003), *The role of dynamic capabilities in e-business transformation*, European Journal of Information Systems, 12, 282-296.

[7] Dremel, C., Wulf, J., Herterich, M. M., Waizmann, J. C., Brenner, W. (2017), *How AUDI AG established big data analytics in its digital transformation*, MIS Quarterly Executive, 16(2).

[8] Grandon, E. E., Pearson, J. M. (2004), *Electronic commerce adoption: An empirical study of small and medium US businesses*, Information and Management, 42(1), 197-216.

[9] Hassan, H., Nasir, M. H. M., Khairudin, N., Adon, I. (2017), *Factors influencing cloud computing adoption in small medium enterprises*, Journal of Information and Communication Technology, 16(1), 21-41.

[10] Hess, T., Matt, C., Benlian, A., Wiesböck, F. (2016), *Options for formulating a digital transformation strategy*, MIS Quarterly Executive, 15(2).

[11] Hinchcliffe, D. (2015), *How should organizations actually go about digital transformation*, Retrieved from <https://dionhinchcliffe.com/2015/06/10/how-should-organizations-actually-go-about-digitaltransformation/>.

[12] Kane, G. (2019), *The technology fallacy: People are the real key to digital transformation*, Research Technology Management, 62(6), 44-49.

[13] Kohli, R., Johnson, S. (2011), *Digital transformation in latecomer industries: CIO and CEO leadership lessons from Encana Oil and Gas (USA) Inc*, MIS Quarterly Executive, 10(4).

[14] Lederer, M., Knapp, J., Schott, P. (2017), *The digital future has many names-How business process management drives the digital transformation*, In 2017 6th International Conference on Industrial Technology and Management (ICITM) (22-26), IEEE, Cambridge, UK.

[15] Li, L., Su, F., Zhang, W., Mao, J. (2018), *Digital transformation by SME entrepreneurs: A capability perspective*, Information Systems Journal, 28(6), 1129-1157.

[16] Low, C., Chen, Y., Wu, M. (2011), *Understanding the determinants of cloud computing adoption*, Industrial Management and Data Systems, 111(7), 1006-1023.

[17] Ministry of Planning and Investment of Vietnam (2021), *Handbook of digital transformation for businesses in Vietnam*.

[18] Nadkarni, S., Prügl, R. (2021), *Digital transformation: a review, synthesis and opportunities for future research*, Management Review Quarterly, 71, 233-341.

[19] Oliveira, T., Thomas, M., & Espadanal, M. (2014), *Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors*, Information and Management, 51(5), 497-510.

[20] Putthiwat, S., Kamonchanok, S., Pongsa, P. (2021), *Factors Influencing Digital Transformation of Logistics Service Providers: A Case Study in Thailand*, Journal of Asian Finance, Economics and Business, 8(5) 0241-0251.

[21] Reis, J., Amorim, M., Melão, N., Matos, P. (2018), *Digital Transformation: A Literature Review and Guidelines for Future Research*, Trends and Advances in Information Systems and Technologies, 1, 411-421.

[22] Smirnova, A. M., Zaychenko, I. M., Bagaeva, I. V. (2019), *Formation of requirements for human resources in the conditions of digital transformation of business*, In International Conference on Digital Technologies in Logistics and Infrastructure *(*ICDTLI 2019) (pp.280-285). Atlantis Press.

[23] Stoianova, O.V., Lezina, Tatiana, Ivanova, Victoriya (2020), *Corporate Culture: Impact on Companies' Readiness for Digital Transformation*, In: Bach Tobji, M.A., Jallouli, R., Samet, A., Touzani, M., Strat, V.A. & Pocatilu, P. (eds), Digital Economy. Emerging Technologies and Business Innovation. ICDEc 2020.

[24] Ta, V. A., Lin, C. Y. (2023), *Exploring the Determinants of Digital Transformation Adoption for SMEs in an Emerging Economy*, Sustainability, 15(9), 7093.

[25] Tabachnick, B. G., Fidell, L. S. (1996), *Using multivariate statistics*, Northridge. Cal.: Harper Collins.

[26] Vietnam Business Development Department, (2021), *Digital transformation annual report 2021: Barriers and needs for digital transformation*.

[27] White, M. (2012), *Digital workplaces: Vision and reality*, Business information review, 29(4), 205-214.

[28] Yokoi, T., Shan, J., Wade, M., Macaulay, J. (2019), *Digital Vortex 2019: continuous and connected change*, Lausanne: Global Center for Digital Business Transformation.

[29] Zinder, E., Yunatova, I. (2016), *Synergy for digital transformation: person's multiple roles and subject domains integration*. In Digital Transformation and Global Society: First International Conference, DTGS 2016, St. Petersburg, Russia, June 22-24, 2016, Revised Selected Papers 1 (pp. 155-168). Springer International Publishing.