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The factors affecting digital transformation in small and medium enterprises in Hanoi city

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A B S T R A C T

This study evaluates the factors affecting digital transformation for small and medium enterprises (SMEs) in Hanoi city. The research team determined the factors affecting digital transformation for small and medium enterprises based on some models such as the Theory of reasoned action (TRA), Technology Acceptance Model (TAM), Theoretical of planned behavior (TPB), C-TAM-TPB model and Unified Model of Technology Adoption and Use. The research results identify the model of factors that affect the argument transformation SMEs in Hanoi city, including (1) Perceived usability; (2) Perceived behavioral control; (3) Social influence; (4) Expected efficiency, (5) Convenient conditions and (6) Risks existing in digital transformation. The results also show that there are 6 factors affecting the implementation of the credit union of SMEs in Hanoi city, of which 5 factors have positive effects and 1 factor has negative effects. In addition, the results also show that there are certain differences in the intentions and decisions of digital transformation between different types of enterprises.

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1. Introduction

Regarding the effects of the Covid-19 epidemic and the Industrial Revolution 4.0, enterprises, especially small and medium-sized enterprises (SMEs), are gradually moving towards the application of information technology to digitize their operations and increase e-commerce activities. According to a survey by the Enterprise Development Department, the majority of small and medium-sized enterprises face many difficulties in digital transformation. The results have shown that 60.1% of enterprises face difficulties in investment costs and digital technology application while 52.3% meet difficulties in changing business habits and practices as well as lack of internal human resources to apply digital technology; followed by 45.4% difficulties from lack of digital technology infrastructure; 40.4% lack of information about digital technology, and 38.5% in integrating digital technology solutions; over 32% lack of commitment (Thu Huyen, 2022) and understanding of business leaders and managers. The survey results with 1,000 SMEs of the Center for Small and Medium Enterprises, VCCI also clearly show this. Up to 85.2% of enterprises lack financial resources in digital technology applications; over 81% of enterprises lack digital technology infrastructure, 77% lack specialized human resources to access digital technology, and over 65% lack sufficient and reliable companies or consultants (Vu Khue, 2022). Every year, SMEs contribute about 40% of GDP, pay 30% to the state budget, contribute 33% of industrial output value, 30% of export goods value, and attract nearly 60% of employees (Vu Long, 2022; Son, 2021).

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Currently, there are around 360,000 businesses in Hanoi city, of which more than 97.2% are small and medium-sized businesses. These businesses contribute more than 45% of the city's gross regional product (GRDP) and employ more than 50% of its workforce (Thu Hang, 2023). Digital transformation is a key factor for the existence and development of Vietnamese enterprises in general and SMEs in Hanoi in particular. To be successful in implementing digital transformation, understanding the contributing elements and how much each one affects the execution of digital transformation for organizations is essential. Therefore, the research team considers models related to factors affecting intention and behavior such as the Theory of rational behavior (TRA –Ajzen & Fishbein , 1975); the Theoretical model of intended behavior (TPB - Ajzen, 1991); the Technology Acceptance Model (TAM - Davis, 1989); Taylor and Todd's C-TAM-TPB model (1995); and a unified model of technology adoption and use by Venkatesh et al. (2003), thereby proposing a model of factors affecting intention and behavior implement digital transformation for SMEs in Hanoi city. Next, the research team carried out building models, research hypotheses, building scales, questionnaires, and surveys to collect the opinions of middle and senior leaders of SMEs in Hanoi. From the quantitative survey results, the research team performed a quantitative analysis test with the support of SPSS statistical software and determined the level of impact of each factor on the intention and behavior of transformation for SMEs in Hanoi city.

2. Digital transformation in small and medium enterprises in Hanoi city

2.1. Digital transformation

According to Ziyadin and Suieubayeva (2020), The combination of technology, mathematics, and business processes in the digital economy is known as “digital transformation”. The identity of the transformative business is defined by three organizational dimensions: (i) Improving customer experience (ii) Changing business goals and the organizational structure of the enterprise; (iii) Establishing a completely new business model (Hess et al., 2016).

According to the Ministry of Planning and Investment, Vietnam (2021b), digital transformation is defined as “The integration and application of digital technology to improve business efficiency, management efficiency, and capacity building the competitiveness of enterprises and creating new values”. Some digital transformation activities can range from digitizing business and management data of enterprises, applying digital technology to automate and optimize business processes, management processes, production and business, reporting processes, and work coordination in the enterprise to transforming the entire business model, creating new value for the business.

Digital transformation (Liu et al., 2011; Trang, 2021) also needs to be distinguished from the concepts of “digitization” and “digitalization”, although these are three closely related processes.

Digitization → Digitalization → Digital transformation

The process of *“converting to digital”* is the most basic process, considered as preparing, changing the way information is transmitted, or storing data. Next, enterprises will take the step of *“applying digital technology”*. The process of taking advantage of modern digital technologies such as artificial intelligence, big data, social networks, and automated programs to connect and process this information brings enterprises many specific benefits, such as: saving cost, time, and human effort. Consequently, the effect of these two processes is *“digital transformation”*.

2.2. Opportunities and threats in digital transformation with SMEs in Hanoi

2.2.1. Opportunities

With the spread of the industrial revolution 4.0 and the change in the needs and habits of consumers, college is no longer an option but becomes an inevitable development trend of enterprises, especially SMEs. The General Statistics Office predicts that retail sales in Hanoi City would be 530,610 billion VND in 2020 and 509,096 billion VND in 2021. Which, *sales from e-commerce* reached nearly 56 trillion VND, accounting for nearly 11% of retail sales of the whole city. The B2C transaction index in Hanoi reached 82.4, while Ho Chi Minh City reached 83.3. After the Covid-19 outbreak, Hanoi's digital change happened more quickly. People's online shopping is becoming more and more simple. The population in Hanoi when considering the number of students, and temporary immigrants in Hanoi is over 10 million people. This shows that the customer scale for B2C transactions in Hanoi is very large (Le, 2023; Hien, 2021).

As one of the two localities with the largest number of enterprises applying digital technology in the country, Hanoi is a pioneer in the growth of colleges generally and e-commerce in particular. Especially in the context of social distancing due to Covid-19; As the demand for products and services from technology applications increases, colleges help enterprises organize flexible business activities, easily optimize resources and save costs. In addition, the Government in general, and Hanoi city, in particular, have determined that perfecting institutions is a prerequisite for the conversion process of enterprises. The Government has recently issued policies and approved programs to encourage and support colleges of enterprises. The *“National Digital Transformation Program to 2025, orientation to 2030 with a vision to 2030, Vietnam becomes a digital*

country" was adopted by the government on June 3, 2020. Hanoi City has implemented many solutions to form a supporting ecosystem to promote trade unions for SMEs in the area. On August 17, 2020, the City People's Committee issued Plan No. 167/KH-UBND to support SMEs in the city to promote SME development, growth in quality, and efficiency. According to this plan, SMEs will receive comprehensive support including legal advice, financial support for human resource training, improvement of management skills, and support for SMEs to access credit; tax; production premises; technology, incubator, technical base; market expansion.

2.2.2. Threats

Vietnam is one of the pioneer countries that has built a thematic program on national colleges. However, two outstanding challenges hinder the conversion process for Vietnamese enterprises in general and SMEs in Hanoi in particular, including:

(i) *Lack of digital mindset*: Simultaneously with the conversion process is the transformation of thinking, working habits, and methods. The essence of college is to change the way enterprises operate with digital technologies, not the use of digital technologies, so the thinking and perception of each individual from business leaders to employees need to change.

(ii) *Lack of human resources:* Although Vietnam is considered a country with a strong development in information technology because demand is greater than supply, it leads to a shortage of information technology human resources. In addition, the financial capacity of SMEs is limited while technology investment requires quite large initial investment capital, especially investment in infrastructure, and human resources. Due to limited resources. The process of vocational training is still slow and lacks initiative, and the capacity to access, apply and develop modern technology is still low.

3. Overview of technology acceptance research models

3.1. Theory of Reasoned Action - TRA

TRA is a research model from a psychosocial opinion that aims to examine the factors of conscious behavioral tendency (Fishbein & Ajzen, 1975).

(1) Consumers' attitudes towards behavior. The individual consumer's perceptions of how their actions will turn out serve as a gauge of their attitude. Consumers tend to promote their plan to utilize a business's goods when they have faith in it.

(2) Subjective norms. Consumers are influenced by stakeholders' attitudes toward using the product and consumers' reasons for engaging in the desired behavior of stakeholders.

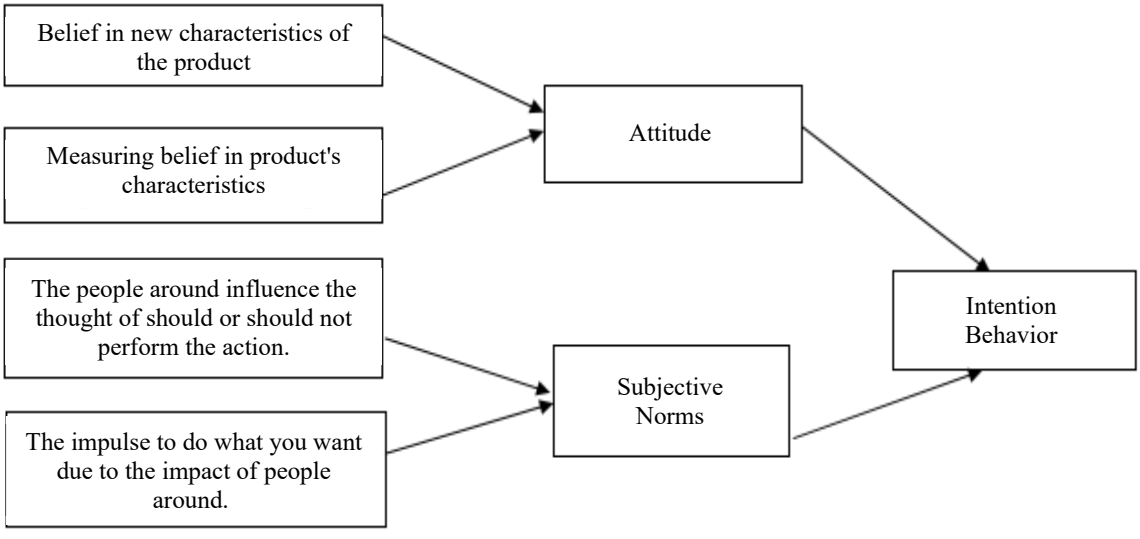


Fig. 1. The theoretical model of reasoned action
Source: Fishbein & Ajzen (1975)

3.2. Theory of Planned Behavior – TPB

This theory was built by Ajzen (1991) from TRA, adding perceived behavioral control factors along with attitude and subjective norms affecting the behavioral intention of consumers.

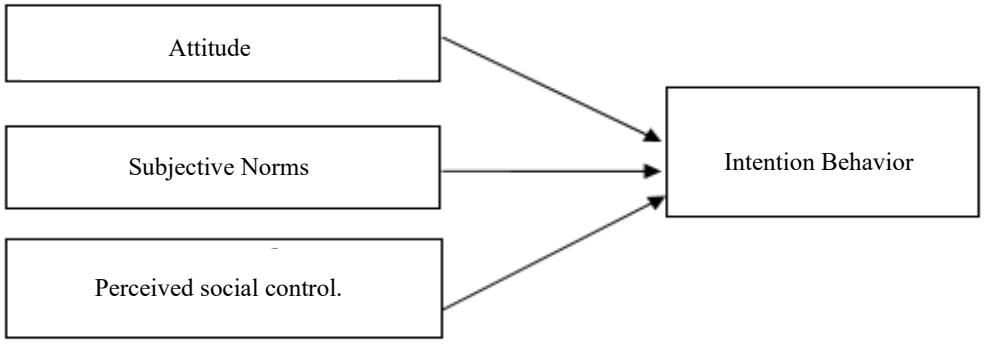


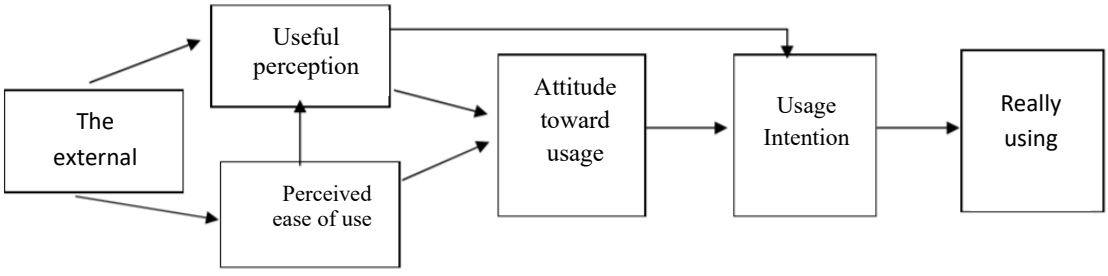
Fig. 2. The theoretical model of planned behavior – TPB

Source: Ajzen, 1991

3.3. Technology acceptance model TAM

The TAM Technology Acceptance Model, developed by Davis in 1989, demonstrates a person's willingness to try and intention to try to adopt new technology. Utilizing technology is a choice that is made with the aim of doing so.

The intention to use technology depends on the attitude of technology users towards technology. Attitudes of technology users depend on two factors: (1) Technology users' perception of the usefulness of technology. (2) Technology users' perception of the ease of use of technology.



Source: Davis, 1989

Fig. 3. Technology acceptance model TAM

3.4. C-TAM-TPB model

Taylor and Todd (1995) inherit TAM's technology acceptance model, combined with Ajzen's TPB (1991) micro-intention theory, this study adds two factors of subjective norm and perceived behavioral control.

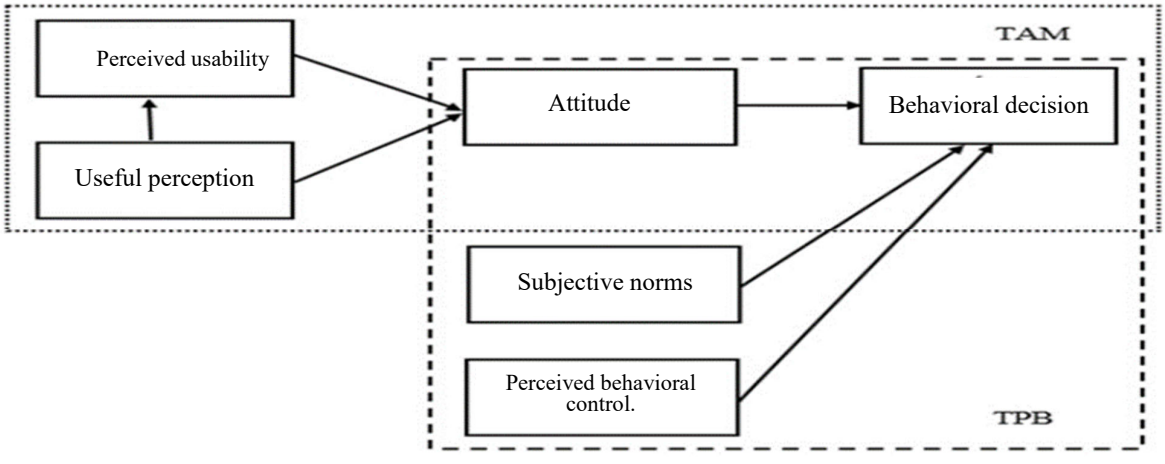


Figure 4. C-TAM-TP model

Source: Taylor & Todd (1995)

(1) Subjective norm is "a person's perception of social pressures to show or not to perform an action". When an individual perceives a higher social expectation for a behavior, the entity tends to conform to that social expectation and perform the behaviour. Research results of Hartwick and Barki (1994) also confirm the link between subjective norms and intention to use the system.

(2) Perceived behavioral control is a person's sense of how simple or complex a behavior is to carry out (connected to the availability of essential resources, expertise, and opportunity to use technology). Some later studies by Herrero Crespo & Del Bosque (2010) also support this point.

3.5. Unified Theory of Acceptance and Use of Technology Model (UTAUT)

The model was built by Venkates et al. (2003) is based on eight component models/theories, namely: Theory of Reasoned Action (TRA - Ajzen) & Fishbein, 1975), Theory of planned behavior (TPB - Ajzen, 1991), technology acceptance model (TAM - Davis, 1989), motivation model (MM – Davis et al., 1992), a model combining TAM and TPB - C - TAM - TPB – (Taylor & Todd, 1995a, 1995b), personal computer usage model - MPCU (Thompson, Higgins & Howell, 1991), innovation diffusion theory (IDT). - Moore & Benbasat, 1991), social cognitive theory (SCT - Compeau & Higgins, 1995).

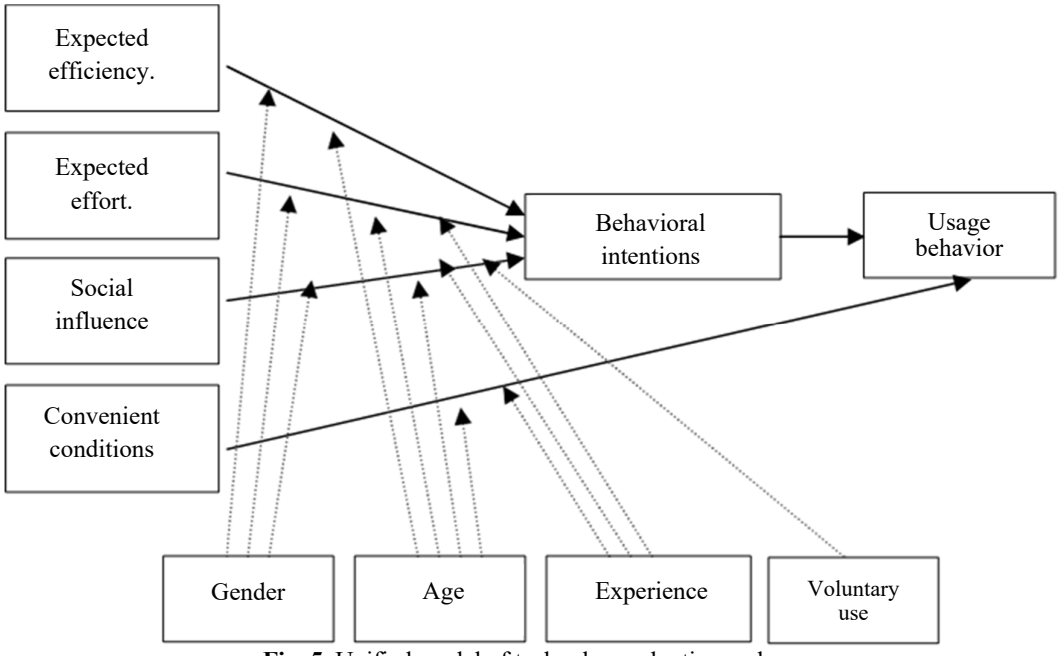


Fig. 5. Unified model of technology adoption and use

Source: Venkatesh & Davis (2000)

Expected efficiency: The degree to which they believe that using a particular system will help them achieve high performance.
Expected effort: The ease of use of the system.
Social influence: The degree to which other people believe they should use the system.
Convenient conditions: The degree to which the technical and infrastructure organization exists to support the use of the system.
Intermediate factors: Through important aspects, gender, age, experience, and desire to utilize have an indirect impact on behavioral intentions.

4. Model of factors that affect the implementation of digital transformation for SMEs in Hanoi city

4.1. Research model

Based on the theory of digital transformation and ones in enterprises; at the same time, review the research models that accept technology from the following models: Theory of reasoned action model (TRA - Ajzen & Fishbein, 1975); Theoretical of planned behavior model (TPB - Ajzen, 1991); Technology Acceptance Model (TAM - Davis, 1989); Taylor and Todd's C-TAM-TPB model (1995a, 1995b); And the unified model to accept and use technology Venkatesh et al. (2003), the research team proposes a model to examine the factors affecting the implementation of the college of SMEs in Hanoi city as follows:

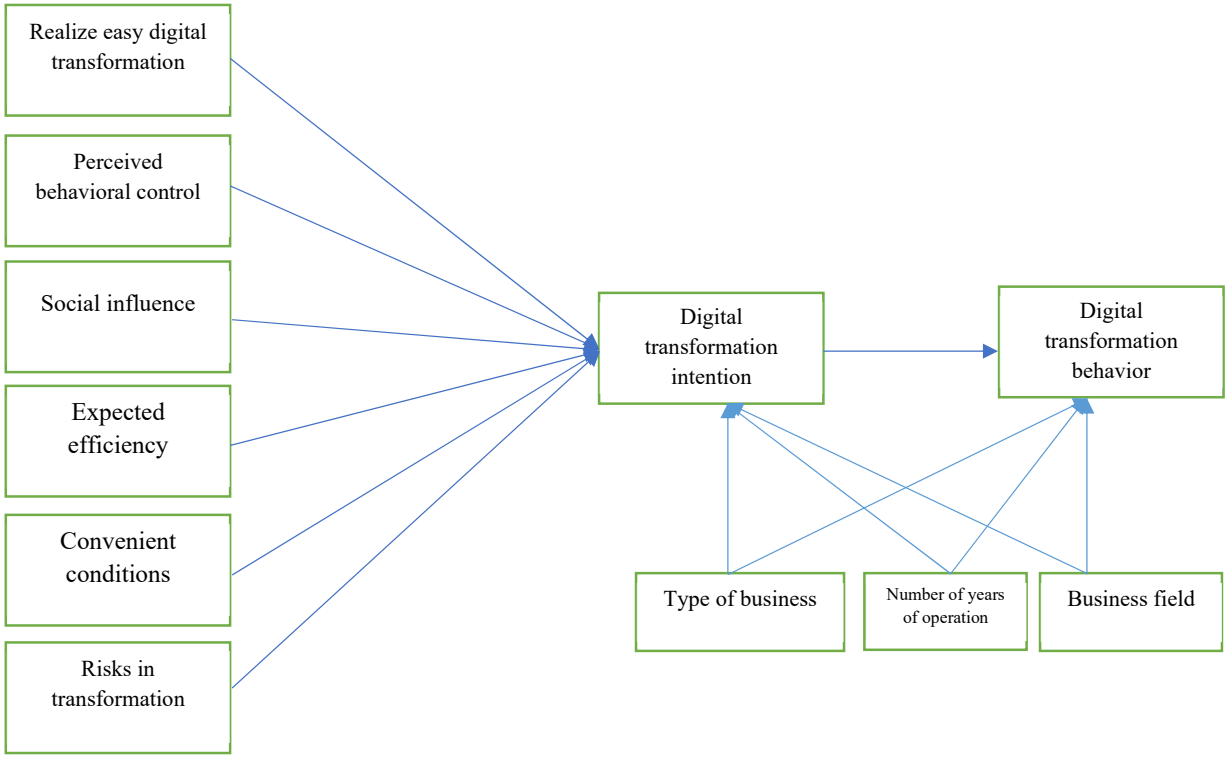


Fig. 6. Research model

Source: The research team

Perceived usability: Enterprises realize that the use of modern digital technologies does not require much effort.
Perceived behavioral control: The enterprise is aware of the available resources, knowledge, and level of control over digital transformation activities.
Social influence: Describe how digital transformation decisions in enterprises can be influenced by inevitable societal trends and stakeholder pressures.
Expected efficiency: Enterprises carry out digital transformation if they realize that digital transformations are effective for enterprises.
Convenient conditions: Enterprises are aware of convenient conditions for digital transformation.
Risks existing in digital transformation: These are the risks enterprises feel when implementing digital transformation.
Digital Transformation Intent: This is an intermediary factor affecting the digital transformation decision of enterprises.

In addition, in the research group's model, three control variables are mentioned: Type of enterprise; Number of years of operation, and business sector to examine the difference in the impact of these control variables on *the "Digital Transformation Intention" and "Digital Transformation Decision".*

4.2. Hypothesis and research scale

4.2.1. Research hypothesis

Hypothesis H1: Easy impression of digital transformation is positively correlated with SMEs in Hanoi city's intention to adopt it.
Hypothesis H2: Perceived behavioral control has the same trend with the digital transformation intention in SMEs in Hanoi city.
Hypothesis H3: Social influence has a positive correlation to the digital transformation intention in SMEs in Hanoi city.
Hypothesis H4: Intentions of SMEs in Hanoi city to undergo digital transformation are positively impacted by the desired consequence.
Hypothesis H5: Convenient conditions have a positive and negative trend with the digital transformation intention in SMEs in Hanoi city.
Hypothesis H6: Risk in credit has a negative impact on the digital transformation intention in SMEs in Hanoi city.
Hypothesis H7: The desire to make a digital transformation is a factor that influences SMEs in Hanoi positively.
Hypothesis H8: There is no difference in digital transformation intentions and decisions between enterprises of different types.

Hypothesis H9: There is no difference in digital transformation intentions and decisions between enterprises with different years of operation.
Hypothesis H10: There is no difference in digital transformation intentions and decisions between enterprises in different business fields.

4.2.2. Variables and scales used in research

Table 1
The foundation for the model's variables and factor scales

Code	Observed variables	Sources
1. Perceived usability		
EU1	Easily learn how to use modern digital technology products	*Davis (1989); Taylor & Todd (1995a);* Venkatesh & Davis, (2000); Tan & Teo (2000)
EU2	The implementation of digital transactions is simple and easy to understand	
EU3	Can easily use digital technology products proficiently	
EU4	The process of implementing digital technology products is understood clearly and easily	
EU5	Easily control operations when using digital technology products	
2. Perceived behavioral control		
BC1	Enterprises'necessary resources are available for digital transformation	*Ajzen (1991); Taylor & Todd (1995b);* Shih & Fang (2004); Shih (2004)
BC2	Enterprises are equipped with the necessary knowledge for digital transformation	
BC 3	Enterprises capable of digital transformation	
BC4	Digital transformation is in the business strategy of enterprises	
BC5	Enterprises are ready for the continuous change in digital technology	
3. Social influence		
IE1	Digital transformation is an inevitable trend in the current context	*Viswanath et al. (2003);* Venkatesh & Davis (2000)
IE2	Digital transformation is to be compatible with the supplier's system	
IE3	Digital transformation is to suit the needs and usage habits of customers	
IE4	Digital transformation because competitors are also doing	
IE5	Digital transformation meets the requirements of state management agencies	
4. Expected efficiency		
PE1	Digital transformation helps to save time, money, and effort	*Viswanath et al. (2003)*
PE2	Digital transformation will increase productivity and quality of work	
PE3	Digital transformation helps connect and process information quickly	
PE4	Enhance the competitiveness of enterprises	
PE5	In general, digital transformation is useful and convenient	
5. Convenient conditions		
BI1	Available information technology platforms for enterprises to choose	*Viswanath et al. (2003)*
BI2	Having good information technology infrastructure	
BI3	Enterprises receive a lot of support from state agencies for digital transformation	
BI4	Shopping on e-commerce is increasing day by day	
BI5	Easy to update application software	
6. Risks existing in digital transformation		
RD1	Digital transformation requires users to be proficient in technology	*Pikkarainen et al. (2004). Gillenson & Sherrell (2002); Tan & Teo (2000)*
RD2	Digital transformation may deprive another investment opportunity	
RD3	The digital transformation causes enterprises to increase operating costs in the short term	
RD4	Digital transformation easily reveals the personal information of suppliers, customers, and enterprises	
RD5	Digital transformation reduces cohesion between departments in the enterprise	
7. Digital transformation intention		
IN1	Digital transformation is a good idea	*Fishbein and Ajzen (1975); Davis (1989); Viswanath V, Michael G. Moris, Gordon B. Davis, and Fred D (2003)*
IN2	Enterprises intend to digital transformation comprehensively	
IN3	Enterprises intend to invest more in digital transformation	
IN4	The enterprise intends to increase resources for digital transformation	
8. Deciding on Digital Transformation		
DR1	Digital transformation was a reasonable decision	*Davis, 1989; Taylor and Todd (1995a, 1995b); Viswanath V. Michael G. Moris, Gordon B. Davis, and Fred D (2003)*
DR2	Digital transformation is a wise, smart decision	
DR3	Satisfied with the digital transformation	

Source: Synthesis of the research team

5. Collecting and analyzing research data methodology

Data collection methods: The research sample was collected by surveying the opinions of middle and senior leaders of enterprises in Hanoi. Sampling was carried out by combining two convenient sampling methods because it was difficult for the research team to get a list of subjects to be surveyed and the "snowball" method was the next method to find subjects. based on the suggestion or recommendation of the interviewee. The size of the sample was determined according to the rule of Comrey and Lee (1992) and also refer to the regulation of Hoang Trong & Chu Nguyen Mong Ngoc (2005). With 37 observations to conduct factor analysis, the minimum samples needed 37 x 5 = 185 observations. From the point of view of collecting as many observed samples as possible to ensure the stability of measurement. The study team chose n > 300 for the number of observed samples based on their ability to gather samples. The study team distributed 385 survey questionnaires to ensure a sufficient sample size. 357 votes were gathered, of which 352 were legitimate and included in the analysis. Data from the research will be cleaned up and analyzed using analytical techniques and the SPSS 20.0 software.

Descriptive statistics: Describe the characteristics of the research sample according to predefined distinguishing signs.

Check the reliability of the scale (Cronbach's Alpha)*:* This method evaluates the reliability of the scale by Cronbach's Alpha coefficient and eliminates inappropriate variables. Variables with a total correlation coefficient of less than 0.3 will be excluded. Scales with Cronbach's Alpha from above 0.6 are usable.

Exploratory factor analysis EFA*:* A factor analysis is significant when the KMO value is > 0.5 and the sig value is 0.05. Factor loading factors must be > 0.5. If an observable variable loads on two factors, the loading coefficients must differ by > 0.3. This observable variable is then included in the factor to which it uploads the most data, provided that the factor loading > 0.5 condition is met.

Confirmatory Factor Analysis - CFA: The purpose is to assess the fit of the model with research data, thereby providing convincing evidence of the convergent validity and discriminant validity of the theoretical structure through the Model Fit index. According to Hair et al. (2010), Multivariate Data Analysis, 7th edition indicators considered to evaluate Model Fit include:

CMIN/df 2 is good, and CMIN/df 5 is acceptable
CFI ≥ 0.9 is good, CFI ≥ 0.95 is very good, CFI ≥ 0.8 is acceptable
TLI 0.9 is good, and TFI 0.95 is very good
GFI 0.9 is good, and GFI 0.95 is very good
RMSEA 0.08 is good, and RMSEA 0.03 is very good

SEM linear structural model analysis: We may evaluate the model's complex relationship since the SEM model integrates all the approaches, including multivariate regression, factor analysis, and interrelationship analysis. The SEM model enables the simultaneous estimation of the components of the overall model, measuring the stable (recursive) and non-recursive relationships, measuring direct and indirect effects, including measurement error and residual correlation, and estimating the causal relationship between the latent concepts using indicators that combine measurement and the theoretical model's structure. The SEM model offers flexibility to choose the best model from the suggested models using the confirmatory factor analysis (CFA) method. The SEM model examines the linear structure using the Model Fit indices, just like the CFA model does.

Testing the differential impact of qualitative factors: Using Independence-Sample T-test and One-Way ANOVA test to examine the differential impact of qualitative factors such as type of business, seniority, and field of operation to two dependent variables is the intention of digital transformation and the decision to transform the business

6. Test results, data analysis

6.1. Descriptive statistics

Statistical results in Table 2 show that, out of 352 surveyed enterprises, 80 are limited liability companies (LLCs), accounting for 22.7%; the remaining 272 enterprises operate in the form of joint stock companies, accounting for 77.3%

Table 2
Statistical results on types of enterprises surveyed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Limited liability company	80	22.7	22.7	22.7
	Joint Stock Company	272	77.3	77.3	100.0
	Total	352	100.0	100.0	

Source: The research team's survey results

By field of operation, the data in Table 3 shows that out of 352 enterprises surveyed, 143 enterprises operate in the field of commercial business (accounting for 40.6%); 92 industrial production enterprises (accounting for 26.2%); 75 enterprises produce products in the agricultural sector (accounting for 21.3%), the remaining 42 enterprises in the service sector (accounting for 11.9%).

Table 3
Descriptive statistics results by field of activity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Commercial business	143	40.6	40.6	40.6
	Industrial production	92	26.1	26.2	66.8
	Agricultural production	75	21.3	21.3	88.1
	Service	42	11.9	11.9	100.0
	Total	352	100.0	100.0	

Source: survey results of the research team

In terms of operating time (senior) of operation, the results in Table 4 show that out of 352 enterprises surveyed, there are 56 enterprises with operating time of less than 3 years (accounting for 15.9%); 133 enterprises operating from over 3 years to less than 7 years (accounting for 37.8%); 113 enterprises with operating time from 7 years to 10 years; 50 enterprises operating over 10 years. Thus, most of the surveyed enterprises have a long history of operation.

Table 4
Descriptive statistics results by operation time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3 years	56	15.9	15.9	15.9
	From 3 to less than 7 years	133	37.8	37.8	53.7
	From 7 to less than 10 years	113	32.1	32.1	85.8
	More than 10 years	50	14.2	14.2	100.0
	Total	352	100.0	100.0	

Source: survey results of the research team

6.2. Examine the scale's dependability and quality

The Cronbach's Alpha testing results in Table 5 show that:

For the independent variable *"Perception of ease of use (EU)"*, the Corrected Item-Total Correlation coefficient of all observed variables is greater than 0.3 and the factor Cronbach's Alpha coefficient is greater than 0.6, so all variables' Observations ensure reliability, can be used for further analysis. Variable BC5 runs the second time the Corrected Item-Total Correlation coefficient of all variables for the independent variable "Behavioral Control Perception (BC)" since it has the corrected item-total correlation coefficient of 0.3. All the remaining data are reliable and can be used in further analysis because they are all greater than 0.3 and the factor's Cronbach's Alpha coefficient is greater than 0.6.

Table 5
Cronbach's Alpha test results

		Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Cronbach's Alpha	**.844**				
EU1		13.20	8.323	.635	.816
EU2		13.17	8.016	.638	.815
EU3		13.14	8.067	.660	.809
EU4		13.08	8.144	.622	.820
EU5		13.17	7.923	.694	.800
Cronbach's Alpha	**.882**				
BC1		13.88	7.836	.701	.752
BC2		13.38	7.512	.702	.750
BC3		13.81	7.803	.726	.745
BC4		13.36	7.708	.722	.745
Cronbach's Alpha	**.857**				
IE1		12.11	8.444	.693	.821
IE2		12.14	8.295	.706	.818
IE3		11.63	9.990	.576	.852
IE4		12.10	8.341	.685	.824
IE5		12.16	8.157	.715	.816
Cronbach's Alpha	**.864**				
PE1		14.83	9.080	.665	.839
PE2		14.84	9.114	.646	.844
PE3		14.78	8.704	.697	.832
PE4		14.78	8.950	.700	.831
PE5		14.88	8.949	.709	.829
Cronbach's Alpha	**.854**				
BI1		14.50	8.182	.689	.818
BI2		14.44	8.384	.660	.826
BI3		14.91	8.351	.658	.827
BI4		14.86	8.386	.615	.838
BI5		14.54	7.970	.715	.811
Cronbach's Alpha	**.853**				
RD1		14.88	7.749	.657	.826
RD2		14.93	7.611	.668	.823
RD3		14.86	7.978	.666	.824
RD4		14.96	7.736	.667	.823
RD5		14.87	7.717	.672	.822
Cronbach's Alpha	**.851**				
IN1		10.91	4.861	.701	.806
IN2		10.86	5.047	.674	.817
IN3		10.86	5.018	.695	.809
IN4		10.88	4.911	.690	.810
Cronbach's Alpha	**.874**				
DR1		7.53	2.626	.761	.820
DR2		7.51	2.655	.760	.821
DR3		7.54	2.710	.754	.827

Source: Test results of the research team

The remaining independent variables include *"Social Influence (IE)"; "Expected Efficiency (PE)"*; *"Convenient Conditions (BI)"*; *"Risks existing in digital transformation (RD)"*; *"Digital Transformation Intention (IN)"*; *"Digital Transformation Decision (DR)"*, all observed variables have Corrected Item-Total Correlation coefficient > 0.3 and Cronbach's Alpha coefficient of the factor are > 0.6, so all variables can be reliable and used for further analysis.

6.3. Exploratory factor analysis (EFA)

Results of the first EFA analysis, because the observed variable IE3 has a load factor of less than 0.5, the variable IE3 is excluded. In the second retest, the loading coefficients of the observed variables are all greater than 0.5, so these observed variables contribute significantly to the model. At the Eigenvalue value greater than 1 with the variance extracted Principal Components and rotation Promax, factor analysis has extracted 8 factors from 35 observed variables with Total variance extracted: Extraction Sums of Squared Loadings (Cumulative %)) = 58.97% > 50%. This proves that 58.97% of the variability of the data is explained by the eight factors in the model. Given that the KMO coefficient is 0.93 (>0.5), the analysis is noteworthy. The population-level correlation between the study's observed variables and other variables is demonstrated by the value sig = 0.000 0.05, demonstrating the appropriateness of an EFA factor analysis.

6.4. Confirmatory Factor Analysis - CFA

Following the EFA analysis, with the results converging on 8 representative factors and the Pattern Matrix matrix, the research team conducted a confirmatory factor test CFA to assess the fit of the model with the research data through the Model Fit index. The test results show that the Model Fit indexes are all within the good range: CMIN/DF = 1,055 < 3; GFI = 0.918 > 0.9; CFI = 0.995 > 0.9; TLI = 0.995 > 0.9; RMSEA = 0.013 < 0.08; PCLOSE = 1,000 > 0.05, so it can be concluded that the model fits the data. The estimated value at the Regression Weights index of all observed variables has p-values < 0.05, showing that all variables are significant in the model. The Standardized Regression Weights estimator shows that all the normalized weights are > 0.5, showing that the observed variables have a high degree of agreement and ensure unidirectionality.

Table 6
Correlation test results between latent variables

	CR	AVE	MSV	PE	EU	RD	BI	IN	IE	BC	DR
PE	0.864	0.56	0.384	**0.748**							
EU	0.844	0.521	0.507	0.494***	**0.722**						
RD	0.854	0.539	0.134	-0.304***	-0.187**	**0.734**					
BI	0.855	0.542	0.353	0.491***	0.494***	-0.182**	**0.736**				
IN	0.849	0.585	0.384	0.620***	0.602***	-0.367***	0.594***	**0.765**			
IE	0.852	0.59	0.286	0.503***	0.497***	-0.172**	0.480***	0.534***	**0.768**		
BC	0.883	0.653	0.507	0.517***	0.712***	-0.280***	0.484***	0.615***	0.467***	**0.808**	
DR	0.874	0.698	0.346	0.503***	0.467***	-0.211***	0.532***	0.589***	0.461***	0.523***	**0.836**

Source: Test results of the research team

The results of the correlation test between latent variables in Table 6 show that CR values are all greater than 0.7 and AVE is greater than 0.5, so the scales are all convergent. The square root of the AVE value is larger than the correlations between the latent variables, and the MSV value is smaller than the AVE, so the discriminant between the factors is guaranteed.

6.5. Test model and research hypothesis by SEM

After having the results of checking the suitability of the model by CFA confirmatory factor analysis, the research team put all the observed variables and latent variables that were satisfied into the model to analyze the linear structure model SEM and test hypotheses. The results of SEM linear structural model analysis showed that the values CMIN/DF = 1,100 < 3; GFI = 0.914 > 0.9; CFI = 0.991 > 0.9; TLI = 0.990 > 0.9; RMSEA = 0.017 < 0.08; PCLOSE = 1,000 > 0.05. Thus, the data is considered to fit the model.

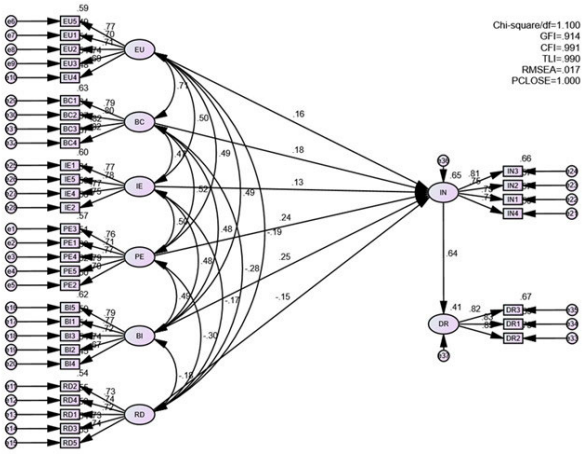


Fig. 7. Analysis results of linear structural model SEM

Source: Model results

The estimated value at the Regression Weights index of all observed variables has p-values < 0.05, showing that all variables are significant in the model. The Standardized Regression Weights estimator shows that all the normalized weights are > 0.5, showing that the observed variables have a high degree of agreement and ensure unidirectionality.

Table 7
Standardized Regression Weights
Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
IN	←	EU	.156
IN	←	BC	.184
IN	←	IE	.128
IN	←	PE	.236
IN	←	BI	.253
IN	←	RD	-.145
DR	←	IN	.639

Source: Model results

The results of the standardized regression estimation in Table 7 show that 5 factors have a positive impact and 1 factor has a negative impact on the intention of digital transformation of enterprises. The factors that influence positively include the factor *"Perceived usability (EU)"*, with a value of 0.156; the factor *"Perceived behavioral control (BC)"* has an impact with a value of 0.184; the factor *"Social influence (IE)"* has a value of 0.128; the factor *"Expected Efficiency (PE)"* has a value of 0.236; The factor *"Convenient conditions (BI)"* acts with a value of 0.25. The factor having the opposite effect is *"Risk in Digital Transformation (RD)"* with an impact value – 0.145. The standardized regression estimate's findings also demonstrate that the hypotheses H1 to H6 are accepted.

The estimated value of R2 (Squared Multiple Correlations) of the dependent variable of intention to convert (IN) is 0.648. It shows that the independent variables explain 64.8% of the variation of variable IN. The R2 value of the dependent variable digital transformation decision (DR) is 0.408 meaning that the variable intent to convert (IN) explains 40.8% of the variation of the DR variable. Hypothesis H7 is accepted.

6.6. Testing the differential impact of qualitative factors

6.6.1. Testing the differential impact with different types of Enterprises

The writers, within the parameters of their study, only consider two types of enterprises that are the majority today, namely limited liability companies and joint stock companies. Because there are only 2 types, the research team uses Independent T-Test. The test results show that Sig Levene's Test is all greater than 0.05, so the assumed Equal variances t-test can be used.

Sig test t of the variable *"Digital Transformation Intention (IN)"* = 0.002 < 0.05, it can be concluded that there is a difference in intention to convert between enterprises of different types. The average statistical results and the graph show that joint stock companies have a higher intention of digital transformation than limited companies. Sig test t of the variable *"Digital transformation decision (DR)"* is 0.104 > 0.05, it can be concluded that there is no difference in digital transformation decisions between enterprises of different types. Thus, hypothesis H8 is partially accepted.

6.6.2. Testing the differential impact with enterprises with different operating time

The operating time of surveyed enterprises is divided into 4 groups, so the research team uses the ANOVA test. The results of the ANOVA test, in the Test of Homogeneity of Variances table, and the Sig Levene's Test are all greater than 0.05, so the F-test sig results in the ANOVA table can be used. In ANOVA table, the F-test Sig is all greater than 0.05, it can be concluded that there is no difference in digital transformation intention as well as digital transformation decision between enterprises with different operating times. Hypothesis H9 is accepted.

6.6.3. Test the differential impact with enterprises with different fields of activity.

The activities of surveyed enterprises are divided into 4 different groups, so the research team uses the ANOVA test. The results of the ANOVA test, in the Test of Homogeneity of Variances table, and the Sig Levene's Test are all greater than 0.05, so the F-test sig results in the ANOVA table can be used.

In the ANOVA table, the Sig test F is all greater than 0.05, it can be concluded that there is no difference in digital transformation intention as well as digital transformation decision between enterprises with different fields of activity. Hypothesis H10 is accepted.

7. Discussing research results

Results of the SEM linear structural model's testing of the model and the research hypotheses, testing the differential impact of qualitative factors show that except for hypothesis H8, the remaining hypotheses are accepted.

Among the 6 influencing factors, 5 factors have a positive impact and 1 has a negative impact on the intention of digital transformation of enterprises. In terms of the level of impact, the most influential factor is *"Convenient conditions (BI)"* with an impact value of 0.253, which means that when convenient conditions for digital transformation increase by 1 The company's *"Digital Transformation Intention"* will increase by 0.253 units, in other words, 25.3% of the variation in digital transformation intention is explained by the perception of the convenient conditions for digital transformation. The second strongest factor is *"Expected Efficiency (PE)"* with an impact value of 0.236, when the expected efficiency from digital transformation increases by 1 unit, the enterprises' intention to engage in a digital transformation will increase further by 0.236 units or 23.6% of the variation in digital transformation intentions, is explained by business expectations about the effectiveness of digital transformation. The factor "Perceived Behavioral Control (BC)" is next, and it has an impact value of 0.184, meaning that when perceived behavioral control for digital transformation grows by 1 unit, the digital transformation intentions of enterprises increase by 0.184 units. In other words, 18.4% of the variation in digital transformation intentions is caused by enterprises' awareness of the resources they have access to, their level of knowledge about it, and their level of control over it. In fourth place is the factor *"Perceived usability (EU)"* with an impact value of 0.156, this index shows that when the perceived ease of using technologies in digital transformation grows by 1 unit, the enterprise's digital transformation intention will increase by 0.156 units, or 15.6% of the change in digital transformation intention, explained by the perception that the use of modern digital technologies does not require much effort on the part of enterprises. The fifth factor that positively affects digital transformation intention is the factor *"Social influence (IE)"* with an impact value of 0.128, meaning that when the influence of society on enterprises increases by 1 unit, the enterprise's digital transformation intention will increase by 0.128 units, in other words, 12.8% of the variation of digital transformation intention is explained by the effects from the inevitable trend of society and pressure from stakeholders such as partners, customers, management agencies. The factor that has a negative impact on digital transformation intention is *"Risk existing in Digital Transformation (RD)"* with an impact value of – 0.145, this index shows that when the perception of enterprises about the level of risk in business when performing digital transformation increases by 1 unit, the intention to convert arguments will decrease by 0.145, in other words, 14.5% of the opposite volatility of digital transformation intention is due to the perception of the business level business risk when implementing digital transformation.

The estimated value of the R^2 index of the dependent variable digital transformation intention is 0.648, showing that 6 independent variables explain 64.8% of the variation in the digital transformation intention of enterprises. The R2 value of the digital transformation decision dependent variable is 0.408, which means that the argument passing intention variable explains 40.8% of the variation of the digital transformation decision variable.

8. Some solutions to promote SMEs' digital transformation

According to research results the factor of advantages for the digital transformation of SMEs has the greatest impact. As a result, state management agencies must concentrate on perfecting mechanisms and policies, successfully implementing the National Digital Transformation Strategy, and enhancing capital, human, and technological resources to develop institutions, digital infrastructure, digital platforms, and digital human resources at the same time. At the same time, state management agencies promote administrative reform, and digital transformation application in state administrative management; deploying digitization tools to improve Vietnam's ranking on e-Government, Innovation, and Global Competitiveness according to the criteria of international organizations.

The next factor that has a strong impact on the digital transformation of SMEs is the awareness of the expected efficiency that digital transformation brings. Therefore, media units such as radio, television, and press publications published in the form of online or offline need to strengthen communication about the benefits of digital transformation so that state management agencies, people, and enterprises clearly understand the benefits and effectiveness of digital transformation, actively participate in and enjoy the benefits that digital transformation brings. Management agencies promote guidance and support people to use online public services, utilities, and digital services safely and effectively, thereby improving the efficiency of state management. Enterprises themselves also need to be aware of the benefits and values and laws of digital transformation, overcome many obstacles in terms of strategy, organizational culture, develop appropriate human resources, etc., thereby creating enable rapid change, increasing employee productivity, increasing employee value, improve process efficiency, and enhance customer experience.

Social factors also have a significant impact on the digital transformation of SMEs. In addition to propaganda and advocacy, state management agencies and media agencies also need to regularly provide information on the digital transformation activities of organizations and enterprises to encourage and encourage other enterprises to implement digital transformation... At the same time, it is also necessary to strengthen socialization resources, access capital from various sources to promote

infrastructure investment deployment, develop high-quality broadband infrastructure, and expand national and regional Internet connections. regional and international as the basis for the digital transformation process of enterprises.

Cognitive factors that control behavior and Perceived usability also have an impact on the digital transformation of SMEs. These factors are related to individual and corporate capacity, so training institutions, enterprises, and professional agencies need to conduct training courses on digital transformation for enterprises; consult and support enterprises in digital transformation; organize seminars, conferences and coordinate with ministries, agencies, localities, associations, and related parties to support and promote enterprises. Transforming thinking through training activities, building digital human resources in various forms such as on-the-job training, online training (e-learning- school), and e-coaching...thereby helping enterprises better grasp the content, efficiency, and ability to implement digital transformation. From there, enterprises can be aware of and control risks and take measures to reduce risks in the digital transformation process.

The bold implementation of digital transformation by SMEs is also necessary. This includes digitizing all enterprise administrative processes and procedures, applying software to work management and data management, and creating an ecosystem of digital transformation products and services.

9. Conclusion

Based on the results of analysis and testing of the research hypothesis model with the support of SPSS statistical software and SEM linear structural model, the research team has identified 5 factors that have a positive impact and 1 factor that has a negative impact on the intention of digital transformation of enterprises with the influence level of 64.8%; From digital conversion intent, 40.8% will translate into digital conversion behavior. Through analysis and verification, the research team also proposes some recommended solutions to state agencies as well as to SMEs to enhance digital transformation in the operation of SMEs. The results of this study are based on quantitative analysis and need to be expanded and combined with qualitative analysis and evidenced by secondary data in the future for clearer results. The research team hopes that this research result will partly support and promote the comprehensive digital transformation process for SMEs in the coming time.

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