

FACTORS AFFECTING DIGITAL TRANSFORMATION IN TRADITIONAL CRAFT VILLAGES: A CASE STUDY OF NGHE AN PROVINCE

My Vo Uyen*, Phu Nguyen Duc**, Van Hoang Thi Thuy***

* Phan Boi Chau High School; ** Vinh University High School; *** Vinh University

ABSTRACT: The research topic investigates factors affecting digital transformation in traditional craft villages in Nghe An province. Based on a quantitative survey method of 267 respondents combined with the OLS regression model, the results show that three main factors have a positive impact and are statistically significant, including: Government support ($\beta = 0,225$), Complexity ($\beta = 0,158$) and Competitive pressure ($\beta = 0,150$). Among these, government support plays a role as the most important driving force, affecting the digital transformation intention of households in the craft villages of the province. From there, the paper also proposes policy implications for the People's Committee of Nghe An Province to promote digital transformation in local craft villages.

Keywords: Digital transformation, Traditional craft villages of Nghe An, Factors affecting digital transformation

I. INTRODUCTION

In the cultural, social, and economic life of many countries as well as in Vietnam, traditional craft villages once played an important role in creating livelihoods for rural labor, contributing to local economic stability, and serving as a space to preserve tangible and intangible cultural values imbued with the identity of each residential community. Over many generations, handicraft products have not only met essential consumer needs but also represented indigenous knowledge, the skill of artisans, and distinctive cultural traits. However, as large-scale commodity production exploded alongside the drive of industrial revolutions, traditional craft villages have increasingly faced numerous pressures, directly threatening the income and survival of artisans. Cheap, mass-produced industrial items with diverse designs and high productivity have gradually squeezed craft villages into a weak competitive position. Meanwhile, product designs in craft villages are generally slow to innovate; production methods are mostly manual, heavily dependent on the skill and health of workers, making it difficult for establishments to supply large orders requiring consistent quality. This leads to declining and unstable incomes for artisans, posing a major obstacle to attracting the next generation of young laborers.

Nghe An is a province with the largest area in Vietnam, possessing a long history alongside a rich and diverse system of handicraft villages. According to statistics up to the end of 2025, the entire province has 182 recognized craft villages, bringing together tens of thousands of rural workers participating in producing characteristic products such as bamboo and rattan weaving, ceramics, brocade weaving, or agricultural, forestry, and fishery processing, thereby contributing significantly to local socio-economic development and the new rural construction program. However, the development process of craft villages in Nghe An is revealing many bottlenecks: most production establishments are still fragmented, small-scale, at the household level, with obsolete technological equipment; the application of science and technology is slow; there is a lack of investment in styling, packaging, and brand building. On the other hand, state management work in some localities remains confused; support resources are limited and lack synchronization; linkages between production facilities and scientists, businesses, and the market are weak. In addition, environmental pollution pressure is also posing a major challenge to long-term development.

Therefore, in the context of promoting digital transformation and current international integration, conducting a thorough study to clearly identify factors affecting the digital transformation process in traditional craft villages in Nghe An province carries an urgent scientific and practical significance. This not only provides an authentic database for managers but also serves as a premise for proposing feasible solutions, contributing to preserving cultural heritage values and promoting sustainable rural economic development. Stemming from these practical issues, the study "Factors affecting digital transformation in traditional craft villages: A case

study of Nghe An province" aims to measure the level of influence of factors on the digital transformation intention of craft business households here, thereby proposing policies for the People's Committee of Nghe An Province to promote this process in the next phase.

II. THEORETICAL FRAMEWORK AND RESEARCH MODEL

2.1. Theoretical Framework

Diffusion of Innovations (DOI) Theory, developed by Everett Rogers (Rogers, 1995, 2003). This is one of the classic theoretical frameworks used to explain the channels, speed, and reasons why a new idea, product, or technology spreads through communication channels in a social system over time. The central content of this theory points out that the adoption rate of an innovation is heavily governed by five perceived characteristics of new technology, including Relative Advantage, Compatibility, Complexity, Trialability, and Observability. When applied to the context of digital transformation in traditional craft villages, the DOI Theory serves as an important scientific basis for evaluating the perceptions of artisans, producing households, and business entities. Specifically, Relative Advantage reflects the perception of whether digital technology helps increase revenue, expand outlets, and improve productivity vastly superior to manual methods. Compatibility demonstrates the harmony between digital technology and cultural customs, household scale, and long-standing living habits of the craft village community. Meanwhile, Complexity reflects the barriers and difficulty when operating digital applications, especially for older workforce members.

Technology Acceptance Model (TAM), proposed for the first time by Fred Davis in 1989 (Davis, 1989; Davis et al., 1989), originates from the Theory of Reasoned Action (Ajzen & Fishbein, 1980) and became a classic theoretical framework to explain human acceptance behavior towards new technology. TAM argues that the decision to use a system or technology is governed directly and indirectly by two important subjective cognitive factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), thereby impacting attitudes toward use and forming behavioral intentions that lead to actual technology usage behavior. The TAM model explains why craft village entities decide to embrace or hesitate over the digitization process. If production households perceive that digital technology brings practical value such as increasing revenue, optimizing costs, and seeking more customers, they will have a positive attitude and be ready to accept it. Conversely, because most craft village labor has limited information technology capacity, digital applications require high visual appeal and perceived ease of use to reduce hesitation and fear, thereby raising adoption rates.

Technology - Organization - Environment (TOE) Framework, developed by Louis Tornatzky and Mitchell Fleischer in 1990 (Tornatzky & Fleischer, 1990), is a famous organization-level theoretical framework used to explain factors affecting the process of adopting and implementing technological innovation in enterprises. This model argues that an organization's decision to adopt new technology is simultaneously governed by three main contexts: Technological Context, Organizational Context (scale, management structure, financial resources, quality of human resources, and internal culture), and Environmental Context (industry structure, level of market competition, legal framework, and support from state agencies). The TOE theoretical framework provides a comprehensive perspective at the production organization level (including business households, cooperatives, and small enterprises in craft villages) regarding internal and external factors governing digital transformation decisions. Through this lens, the study can simultaneously examine internal barriers regarding financial capacity and human resource capability within the organization, combined with external impacts such as market competitive pressure or practical support policies from the state government.

2.2. Research Model

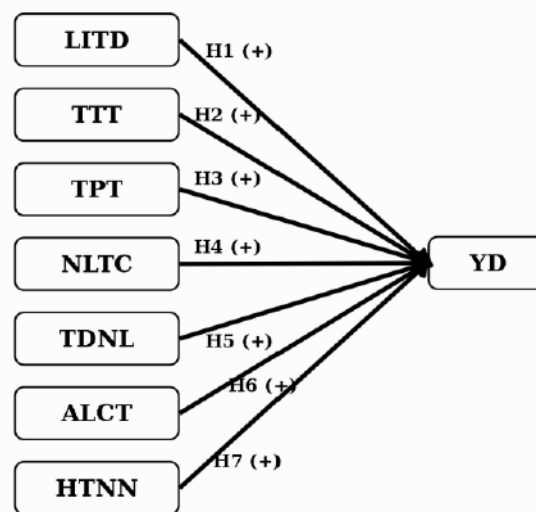
Based on inheriting and integrating three foundational theoretical frameworks including the Diffusion of Innovations Theory (DOI), Technology Acceptance Model (TAM), and Technology - Organization - Environment Framework (TOE), combined with practical features of traditional craft villages, the study proposes a linear regression model consisting of 07 factors impacting digital transformation intention in traditional craft villages.

$$YD = \beta_0 + \beta_1 LITD + \beta_2 TTT + \beta_3 TPT + \beta_4 NLTC + \beta_5 TDNL + \beta_6 ALCT + \beta_7 HTN + \epsilon$$

In which, the dependent variable of the model is digital transformation intention (YD). The constant of the model is denoted as β_0 , β_1 through β_7 are partial regression coefficients corresponding to the independent variables, and ϵ is the error term of the model.

The proposed research model includes 7 independent variables and 1 dependent variable with 24 observed variables referenced from studies by Rogers (2003); Nguyen Thi Ngoc (2026); Nguyen Le Duy (2026); Tornatzky & Klein (1982); Zhu et al. (2006); Davis (1989); Tornatzky & Fleischer (1990); Venkatesh & Davis (2000). The proposed research model is presented in Figure 1.

Figure 1. Proposed Research Model



The research hypotheses include:

Hypothesis H1: Relative advantage has a positive impact on the digital transformation intention of entities in traditional craft villages.

Hypothesis H1 suggests that relative advantage has a positive impact on digital transformation intention in traditional craft villages. Based on the foundation of the Diffusion of Innovations Theory (Rogers, 2003), when establishment owners clearly perceive the superior value of technology over manual methods, they will increase their intention to apply it. This impact is expressed through three aspects. First, digital transformation helps facilities increase revenue and expand consumption markets (LITD1), overcoming geographical barriers to reach larger customers (Rogers, 2003). Second, digital solutions help optimize production costs and operational management (LITD2), controlling raw materials and reducing losses better than old methods (Nguyen Thi Ngoc, 2026). Third, technology supports enhancing quality and diversifying handicraft product designs (LITD3), helping products become more uniform and catch up with modern tastes while still retaining cultural identity (Rogers, 2003; Nguyen Thi Ngoc, 2026).

Hypothesis H2: Compatibility has a positive impact on the digital transformation intention of entities in traditional craft villages.

Hypothesis H2 suggests that compatibility has a positive impact on the digital transformation intention of entities in traditional craft villages. Based on the foundation of the Diffusion of Innovations Theory (Rogers, 2003), when technological solutions are in harmony with production characteristics, establishment owners will reduce psychological barriers and become more ready to embrace them. Observed variables include: First, digital transformation solutions are suitable for production scale (TTT1), ensuring feasibility for households or small-scale facilities in craft villages (Rogers, 2003). Second, the digital transformation process is suitable and does not lose the traditional cultural values of the craft village (TTT2), helping preserve core identity (Nguyen Le Duy, 2026). Third, digital technologies suit our long-standing traditional craft practice habits and needs (TTT3), creating familiarity and ease of adoption (Rogers, 2003; Nguyen Le Duy, 2026).

Hypothesis H3: Complexity has a negative impact on the digital transformation intention of entities in traditional craft villages.

Hypothesis H3 suggests that complexity has a negative impact on the digital transformation intention of entities in traditional craft villages. Based on the Diffusion of Innovations Theory (Tornatzky & Klein, 1982), when technology causes many barriers during usage, facility owners and workers will form a hesitant mindset, thereby reducing application intention. Observed variables include: First, workers feel difficulty operating and using software or platforms (TPT1), causing hindrances in daily work (Tornatzky & Klein, 1982). Second, using digital technologies requires spending a lot of time to learn and get accustomed to (TPT2), which is not suitable for a fast production pace (Nguyen Thi Ngoc, 2026). Third, the lack of visual technical guidance easily makes me feel discouraged when approaching digital technology (TPT3), increasing the tendency to give up (Tornatzky & Klein, 1982; Nguyen Thi Ngoc, 2026).

Hypothesis H4: Financial capacity has a positive impact on the digital transformation intention of entities in traditional craft villages.

Hypothesis H4 suggests that financial capacity has a positive impact on the digital transformation intention of entities in traditional craft villages. Based on the Technology - Organization - Environment

Framework (Zhu et al., 2006), when facilities possess solid financial resources, they will be more confident in planning and deploying digitization solutions. Scales include: (1) Production facilities have sufficient capital to invest in equipment and digital software (NLTC1) (Zhu et al., 2006), (2) Costs of maintaining and operating digital infrastructure are within financial capacity (NLTC2) (Nguyen Le Duy, 2026), (3) Proactiveness in regularly balancing the budget to upgrade systems (NLTC3) (Zhu et al., 2006; Nguyen Le Duy, 2026).

Hypothesis H5: Human resource capacity has a positive impact on the digital transformation intention of entities in traditional craft villages.

Hypothesis H5 suggests that human resource capacity has a positive impact on the digital transformation intention of entities in traditional craft villages. Based on the Technology Acceptance Model (Davis, 1989), when facility owners and workers have an educational background, information technology understanding, and proactiveness in absorbing new knowledge, they will easily access and confidently make decisions to apply technology (Davis, 1989; Nguyen Thi Ngoc, 2026). Scales include: First, facility owners and workers have basic understanding of information technology (TDNL1), creating a solid initial cognitive foundation (Davis, 1989). Second, personnel at the facility are always ready to acquire new digital knowledge and skills (TDNL2), breaking psychological hesitation towards new things (Nguyen Thi Ngoc, 2026). Third, workers quickly adapt to and master new digital tools after being guided (TDNL3), helping the deployment process occur effectively (Davis, 1989; Nguyen Thi Ngoc, 2026).

Hypothesis H6: Competitive pressure has a positive impact on the digital transformation intention of entities in traditional craft villages.

Hypothesis H6 suggests that competitive pressure has a positive impact on the digital transformation intention of entities in traditional craft villages. Based on the Technology - Organization - Environment Framework (Zhu et al., 2003), facing the dominance of mass-produced industrial goods and the strong digitization trend of competitors in the market, craft villages are forced to change operational methods to survive, creating a drive that promotes digital transformation intention (Zhu et al., 2003; Nguyen Le Duy, 2026). Scales include: First, we are under great competitive pressure from manufactured industrial products (APCT1), creating direct challenges to the market output of traditional products (Zhu et al., 2003). Second, competitors have implemented digital technology and created great advantages in the market (APCT2), forcing facilities to change to avoid falling behind (Nguyen Le Duy, 2026). Third, constant market changes and shopping behavior force facilities to digitize to retain customers (APCT3), ensuring long-term adaptability and development (Zhu et al., 2003; Nguyen Le Duy, 2026).

Hypothesis H7: Government support has a positive impact on the digital transformation intention of entities in traditional craft villages.

Hypothesis H7 suggests that government support has a positive impact on the digital transformation intention of entities in traditional craft villages. Based on the Technology - Organization - Environment Framework (Tornatzky & Fleischer, 1990), price subsidy policies, free digital skills training programs, telecommunications infrastructure support, and trade promotion from local government will create a solid logistical backbone, consolidating confidence and encouraging craft village entities to boldly participate in digital transformation (Tornatzky & Fleischer, 1990; Nguyen Thi Ngoc, 2026). Scales include: First, facilities receive support policies regarding capital or equipment from the government (HTNN1), creating initial physical resources (Tornatzky & Fleischer, 1990). Second, state digital skills training and instruction programs bring practical effectiveness (HTNN2), improving execution capacity for workers (Nguyen Thi Ngoc, 2026). Third, the locality regularly organizes trade promotion activities and digital product promotion for craft villages (HTNN3), expanding market output opportunities and connections (Tornatzky & Fleischer, 1990; Nguyen Thi Ngoc, 2026).

The YD variable (Digital transformation intention) includes observed variables: (1) We plan to implement digital technology applications in the facility's production and business activities (YD1) (Rogers, 2003); (2) We are ready to invest time and financial resources to execute digital transformation (YD2) (Zhu et al., 2006); (3) We fully support and prioritize bringing digital solutions into operation at the craft village (YD3) (Nguyen Thi Ngoc, 2026).

III. RESEARCH METHODOLOGY

The research methodology of the topic was deployed through six main steps, starting from desk research to synthesize secondary documents, build models, and design a preliminary questionnaire. Next was the preliminary qualitative research step through group discussions and in-depth interviews with experts, management officials at the Department of Industry and Trade, and artisans at sample craft villages to assess the suitability of the model and questionnaire. Based on qualitative results, the author group adjusted scales and questionnaires, then deployed the official quantitative survey targeting facility owners, cooperatives, artisans, and direct workers working in craft villages.

Regarding data collection methods, secondary data were synthesized from scientific research works, reports of the People's Committee and Department of Industry and Trade of Nghe An. For primary data, the research used a random survey method with structured questionnaires using a 5-level Likert scale. The sociological survey process was conducted both offline and online. After collection, data were cleaned, coded, and processed on SPSS software to perform Cronbach's Alpha reliability testing, EFA exploratory factor analysis, Pearson correlation analysis, and OLS linear regression model to evaluate the impacts of factors on digital transformation intention in craft villages of Nghe An province.

IV. RESEARCH RESULTS AND DISCUSSION

The author group conducted a survey on 400 craft village artisans in Nghe An, yielding 315 collected questionnaires. After cleaning the data and removing incomplete response sheets, 267 valid questionnaires were obtained, coded, and entered into SPSS 20 software.

The survey sample has the following characteristics: Regarding age, the majority of people participating in craft village activities in the survey sample were aged between 30 and under 60 years old (accounting for 41.57%) and from 60 years old and above (accounting for 38.58%), while the workforce under 30 participating in the survey accounted for a lower proportion at 19.85%.

Regarding educational attainment of surveyed respondents, the group that graduated primary or lower secondary school accounted for the largest proportion at 40.07%, followed by upper secondary school accounting for 25.84%, college and vocational high school qualifications accounting for 18.35%, respondents with university and postgraduate degrees accounting for 7.49%, and the uneducated group accounting for only 8.24%.

Regarding craft experience, most people in the survey sample had long-term seniority, in which the group with 20 years of experience or more accounted for the highest rate at 60.67%, followed by the group from 10 to under 20 years accounting for 20.60%. Respondents with experience under 5 years and from 5 to under 10 years recorded rates of 10.86% and 7.87% respectively.

Regarding living regions of accessed respondents, the number of survey participants in midland areas accounted for an overwhelming proportion at 71.16%, followed by coastal and plain areas accounting for 18.73%, and high mountainous areas accounting for 10.11%.

Scale Reliability Evaluation

Cronbach's Alpha is a statistical test on the closeness (ability to explain a research concept) that survey items in a scale are equivalent to one another; in other words, this coefficient indicates whether measures are linked together. Many researchers agree that when the Cronbach's Alpha coefficient has a value from 0.8 up to near 1.0, it is a good scale; from 0.7 to near 0.8 is usable. Therefore, for this study, the author applies a Cronbach's Alpha coefficient from 0.6 or higher as usable.

Reliability test results of Cronbach's Alpha in Tables 1 and 2 show that all factors in the model met requirements when having Cronbach's Alpha coefficients ranging from 0.806 to 0.934, all greater than the standard level of 0.6. At the same time, all observed variables had item-total correlation coefficients greater than 0.3. Therefore, all observed variables belonging to the factors achieved good reliability and were completely suitable to be included in the subsequent Exploratory Factor Analysis (EFA) step.

EFA Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) results for independent variables show that the KMO value reached 0.783 ($0.5 \leq KMO \leq 1$) and Bartlett's test was statistically significant with $\chi^2 = 4018.915$ ($Sig. = 0.000 < 0.05$), proving that data were completely suitable for factor analysis. Total variance extracted reached 81.873% (greater than 50%) with 7 factors extracted at Eigenvalue level = $1.219 \geq 1$. At the same time, factor loadings of all observed variables were greater than 0.5 (ranging from 0.723 to 0.919) and cross-loading phenomena did not appear (Table 1), thereby confirming scales guaranteed convergent validity and discriminant validity for inclusion in subsequent analysis.

Table 1: Cronbach's Alpha coefficients and rotated factor matrix for independent variables

	Component							Cronbach's Alpha
	1	2	3	4	5	6	7	
TPT2	.919							0.934
TPT3	.877							
TPT1	.809							
TDNL2		.896						0.903
TDNL1		.868						

TDNL3		.867						
TTT2			.908					0.886
TTT1			.896					
TTT3			.845					
LITD2				.848				0.893
LITD3				.842				
LITD1				.799				
ALCT2					.906			0.876
ALCT3					.891			
ALCT1					.881			
NLTC3						.850		0.866
NLTC2						.836		
NLTC1						.813		
HTNN3							.898	0.806
HTNN1							.864	
HTNN2							.723	

Along with that, results from the Component Matrix show that factor loadings of item variables YD2, YD1, YD3 of the dependent factor YD were 0.946; 0.943 and 0.925 respectively; all greater than 0.5. This indicates that component variables under the Digital Transformation Intention factor have close correlations, ensuring convergent validity for inclusion in subsequent analysis steps.

Table 2: Cronbach's Alpha coefficients and factor matrix for dependent variable

Component Matrix^a

	Component	Cronbach's Alpha
	1	
YD2	.946	0.931
YD1	.943	
YD3	.925	

Pearson Correlation Analysis

To conduct correlation analysis, the author calculated mean values of variables belonging to independent and dependent factors based on classification and re-arrangement of factor groups after reliability testing and factor analysis. Pearson Correlation analysis results show that Sig. values of all independent factors relative to the dependent variable Digital Transformation Intention (YDtb) were less than 0.05 (specifically: LITDtb has Sig. = 0.000; TTTtb has Sig. = 0.003; TPTtb has Sig. = 0.000; NLCTb has Sig. = 0.000; TDNLtb has Sig. = 0.000; APTCtb has Sig. = 0.003 and HTNNtb has Sig. = 0.000), showing that all independent factors have linear correlations with the dependent variable and are statistically significant. Therefore, no factor was eliminated, and all factors met conditions to perform regression analysis in the next step.

Linear regression coefficient analysis results in Table 3 show that Sig. values of independent factors in the model differed. Specifically, factors TPTtb (Complexity, Sig. = 0.023), APTCtb (Competitive pressure, Sig. = 0.009) and HTNNtb (Government support, Sig. = 0.000) all had Sig. values less than 5%, proving these factors were statistically significant in the model and all had impacts on the Digital Transformation Intention factor. Meanwhile, factors LITDtb (Sig. = 0.138), TTTtb (Sig. = 0.353), NLCTb (Sig. = 0.963) and TDNLtb (Sig. = 0.301) had Sig. values greater than 5%, failing to reach statistical significance in this regression model.

Table 3. OLS Linear Regression Results

Coefficients ^a									
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance VIF

1	(Constant)	.611	.424		1.442	.151					
	LITDtb	.104	.070	.105	1.486	.138	.306	.092	.083	.615	1.625
	TTTtb	.050	.053	.056	.931	.353	.165	.058	.052	.844	1.185
	TPTtb	.158	.069	.158	2.281	.023	.310	.140	.127	.644	1.553
	NLTCtb	.003	.066	.003	.046	.963	.226	.003	.003	.691	1.447
	TDNLtb	.068	.065	.067	1.037	.301	.209	.064	.058	.737	1.356
	ALCTtb	.146	.055	.150	2.650	.009	.165	.162	.147	.969	1.032
	HTNNtb	.284	.074	.225	3.822	.000	.312	.231	.212	.894	1.118
a. Dependent Variable: YDtb											

Thus, the regression equation (according to Unstandardized Coefficients B) of the model expressing the relationship between factors impacting the Digital Transformation Intention factor (YDtb) is:

$$YDtb = 0,611 + 0,158 \times TPTtb + 0,146 \times ALCTtb + 0,284 \times HTNNtb$$

Regression results show that the Digital Transformation Intention factor has a linear relationship with factors of statistical significance. To be specific, the author separates each factor for analysis to see the influence of each factor on the Digital Transformation Intention factor based on the Standardized Coefficients Beta.

The highest level of influence on the Digital Transformation Intention factor is the Government support factor (Beta = 0.225, positive impact), followed by the Complexity factor (Beta = 0.158, positive impact) and finally the Competitive pressure factor (Beta = 0.150, positive impact).

Table 4. Assessment of Regression Model Fit

Model Summary^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.647 ^a	.419	.402	.72227	.419	9.252	7	259	.000	1.912
a. Predictors: (Constant), HTNNtb, ALCTtb, TDNLtb, TTTtb, NLTCtb, TPTtb, LITDtb										
b. Dependent Variable: YDtb										

Linear regression analysis results show that the model has a multivariate correlation coefficient $R^2 = 0,419$ and coefficient of determination $R^2(\text{Adjusted R Square}) = 0.402$. This result shows that the fit of the model is 41.9%, or in other words 41.9% of the variation in the Digital Transformation Intention factor is explained by 3 independent factors including: TPTtb (Complexity), ALCTtb (Competitive pressure), and HTNNtb (Government support).

Next, the author tested model fit through F-test in ANOVA variance analysis. Using the F-test with value $F = 9,252$ to test hypotheses about regression model goodness-of-fit to consider whether the Digital Transformation Intention factor has linear relationships with independent factors, with significance level $\text{Sig.} = 0,000 < 0,05$, this demonstrates model fit, meaning the combination of factors present in the model can explain changes in the dependent factor, or in other words at least one independent factor affects the dependent factor.

In summary, the multivariate regression model satisfies evaluation conditions and fit testing for drawing research conclusions.

To check multicollinearity in the model, the author used Variance Inflation Factor VIF. Results show VIF coefficients of factors were respectively: LITDtb (1.625), TTTtb (1.185), TPTtb (1.553), NLTCtb (1.447), TDNLtb (1.356), ALCTtb (1.032), and HTNNtb (1.118). All VIF coefficients were less than 10, thereby confirming the model does not suffer from multicollinearity, and variables entered are completely independent of each other.

Checking whether the model has autocorrelation was performed through the Durbin – Watson coefficient (d). According to regression model results, value $d = 1.912$ fell within the acceptance range (approximately equal to 2), meaning there is *no first-order serial autocorrelation*, or in other words no correlation between residuals in the model.

The author group tested whether residuals follow a normal distribution, because if residuals are non-normal, the model may encounter problems such as specification errors in determining significance or non-constant error variance. Therefore, examining residual distribution was conducted by constructing a standard bell-shaped frequency histogram of standardized residuals (Histogram).

Based on the chart, we see that the distribution curve has a balanced bell shape, with a very small Mean ($1,09 \times 10^{-16}$) approaching 0 and Standard Deviation (Std. Dev.) reaching 0.987, very close to 1. From these results, it can be concluded that model regression residuals follow a normal distribution.

Figure 2. Histogram Chart

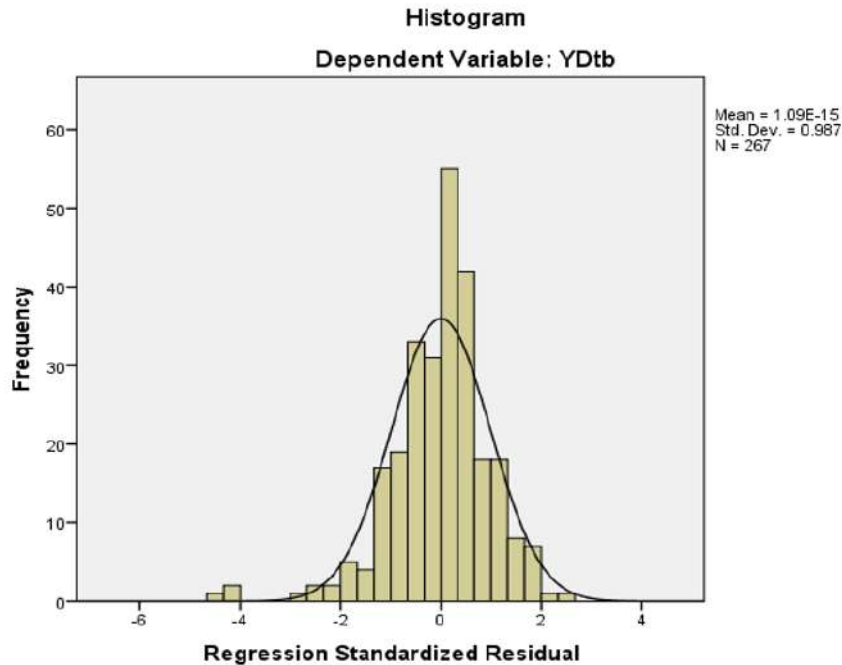


Table 5. Results of OLS Linear Model Testing

Description	Value / Sig.	Result
Relative advantage impacts Digital Transformation Intention	0,138	Rejected (Not statistically significant)
Compatibility impacts Digital Transformation Intention	0,353	Rejected (Not statistically significant)
Complexity has a positive (+) impact on Digital Transformation Intention	0,023	Accepted
Financial capacity impacts Digital Transformation Intention	0,963	Rejected (Not statistically significant)
Human resource capacity impacts Digital Transformation Intention	0,301	Rejected (Not statistically significant)
Competitive pressure has a positive (+) impact on Digital Transformation Intention	0,009	Accepted
Government support has a positive (+) impact on Digital Transformation Intention	0,000	Accepted
Model has no autocorrelation	d = 1,912	Accepted
Model has no multicollinearity	VIF < 10	Accepted

Based on OLS linear regression analysis results regarding factors affecting Digital Transformation Intention in traditional craft villages in Nghe An province, we have specific evaluations as follows:

- Regarding impact level and statistical significance of factors: Out of total independent factors included in the model, three factors reached statistical significance level (Sig. < 0.05) and officially impacted digital transformation intention of production facilities, including: Government support (Beta = 0.225), Complexity (Beta = 0.158), and Competitive pressure (Beta = 0.150). Among them, the Government support factor plays a role as the most important driving force and strongest influential power. This reflects the reality that in the initial

stage of digital transformation, craft village entities greatly need support, orientation, capital support, and training policies from state and local authorities.

- Regarding model fit: The multivariate regression model achieved an Adjusted $R^2 = 0.402$ (equivalent to 40.2% of variation in the dependent variable Digital Transformation Intention explained by factors in the model). Simultaneously, ANOVA test results with value $F = 9,252$ (Sig. = 0,000 < 0,05) confirmed the linear regression model is completely appropriate and has overall significance.
- Regarding regression assumptions: Multicollinearity check: All Variance Inflation Factors (VIF) of variables were less than 10 (ranging at low levels from 1.032 to 1.625), proving the model does not experience multicollinearity and independent variables do not duplicate information with each other. Autocorrelation check: The Durbin-Watson test value reached $d = 1.912$ (lying in the safe range approximately equal to 2), confirming the model has no first-order serial autocorrelation. Residual normal distribution check: The bell-shaped frequency histogram of residuals (Histogram) with a mean approaching 0 and standard deviation close to 1 proves residuals follow a normal distribution, ensuring absolute reliability for statistical inferential conclusions of the study.

V. POLICY IMPLICATIONS FOR NGHE AN PROVINCIAL GOVERNMENT

5.1. Continue Direct Support for Craft Villages in Digital Transformation Quantitative research results have proven that the Government support factor plays a role as the most important driving force, possessing the strongest influence on the digital transformation decision and intention of craft village production entities (beta = 0.225). This confirms that in the early stages of the digitization process, when internal resources of business households in craft villages remain limited, the state management agency's enabling, supporting, and leading role at the provincial level is decisive to success or failure.

Therefore, the People's Committee of Nghe An Province needs to focus on directing specialized attached departments, sectors, and branches to coordinate closely to specify key support programs and projects: Regarding finance and digital infrastructure:

- The Provincial People's Committee needs to study establishing and deploying preferential credit packages, price subsidy mechanisms, or supporting a portion of funds from local budgets to help production facilities and cooperatives invest in modern equipment, machinery, advanced packaging technology, barcode systems, and QR code origin traceability templates. Standardizing and transparentizing products through this technology is the key to elevating the brand reputation of Nghe An craft villages in the market.
- Regarding telecommunications infrastructure development in difficult areas: Survey data shows most craft villages concentrate in midland areas (71.16%) and high mountains. Therefore, the Provincial People's Committee needs to direct the Department of Science and Technology to coordinate with telecommunication enterprises to step up investment in network infrastructure development, ensuring high-speed internet coverage and constructing centralized digital connection points in these territories, thoroughly resolving technical infrastructure bottlenecks obstructing people's access to cyberspace.

5.2. Enhance Support Policies to Raise Awareness and Digital Skills for People in Provincial Craft Villages

The regression model identified that the Complexity factor has a positive and statistically significant impact on digital transformation intention (beta = 0.158). This reflects a reality that craft village labor characteristics in Nghe An feature a high average age, educational attainment mostly at lower secondary or primary level, combined with long seniority in traditional manual craft making (more than 60% of workers have 20 years of experience or more), making access to new technology applications often cause hesitation, confusion, and fear of risk.

To thoroughly resolve this bottleneck, the Provincial People's Committee needs to directly instruct specialized agencies to implement highly actionable solutions: Establishing grassroots technical support forces:

- The Provincial People's Committee needs to direct commune and ward People's Committees to coordinate with socio-political organizations to mobilize forces to establish "Community Digital Technology Teams" or mobile technical support teams. These teams have the task of going directly to each production facility, each household to execute the motto "hand-holding instruction", supporting residents in directly operating digital platforms, guiding from account creation steps, product posting to non-cash payment procedures.
- The Provincial People's Committee should assign the Department of Science and Technology as the lead agency, coordinating with the Department of Agriculture and Environment to establish mechanisms for ordering, supporting, or encouraging technology enterprises and digital technology startups in the province to research, develop, and transfer management software and sales applications with minimalist, visual interfaces, maximum Vietnamese support, and easy-to-understand illustrations, fully suitable for the cognitive characteristics and living habits of older workers in traditional craft villages.

5.3. Strengthen Policy Formulation to Promote Consumption of Craft Village Products

In the context of deep economic integration and fierce competition from mass-produced industrial goods, applying digital technology is not only an inevitable trend but has become a survival pressure for traditional handicraft products to maintain market share.

From that reality, the Provincial People's Committee needs to plan strategic directions to transform market pressure into development momentum through synchronized solutions:

- Consolidate and promote the role of Cooperatives as a core: The province needs to continue having mechanisms to consolidate, enhance operational capacity and governance for 39 existing Cooperatives operating in craft villages. These Cooperatives should be viewed as an extended arm of the government to act as a core leading entity, representing small-scale handicraft households to negotiate, connect, and bring products deeper into major, reputable e-commerce platforms such as Postmart, Shopee, Lazada, or TikTok Shop.
- Integrate digital transformation into the OCOP Program and craft village tourism development: The Provincial People's Committee needs to direct the Department of Agriculture and Environment to closely integrate criteria on product data digitization, application of origin traceability QR codes, electronic payments, and online promotion into the criteria set for evaluating and ranking annual periodic OCOP products.
- Speed up the concrete realization of socio-economic development planning linking 5 key craft villages with experiential tourism activities, creating direct trade spaces combined with online trade, thereby creating a healthy competitive environment and positive pressure forcing entities to actively innovate technology to increase economic value for traditional handicraft products of Nghe An.

REFERENCES

- [1]. Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice-Hall.
- [2]. Bui, Q. K. (2024). Dong Cuu embroidery village - Development model of traditional craft in modern society. *Journal of Science*, 1(03), 147–157.
- [3]. Bui, T. T. H., Hoang, H., & Cao, T. P. T. (2025). Craft village development associated with tourism: From theoretical basis to practical model in Thai Nguyen. *Corporate Finance*, Issue 2 December(302), 70–73.
- [4]. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- [5]. Nguyen, A. T. (2026). Digital technology in preserving cultural heritage and traditional craft village products. *Journal of Art*, (59), 27–30.
- [6]. Nguyen, L. D. (2026). *Digital transformation and drivers promoting technological innovation in traditional production areas*. Social Sciences Publishing House.
- [7]. Nguyen, T. M. S., & Nguyen, T. S. T. (2026). Craft villages in Lap Vo district, Dong Thap province in preserving local cultural identity. *Dong Thap University Journal of Science*, 15(4), 50–62.
- [8]. Nguyen, T. N. (2026). Application of digital technology in preserving and developing Vietnamese handicraft villages. *Journal of Economics and Development*, 312(2), 45–58.
- [9]. Nguyen, T. N. (2026). Digital transformation in preserving and promoting values of traditional craft villages: Experience from Japan and implications for Vietnam. *Human Geography Research*, 1(50), 15–25.
- [10]. Nguyen, T. T. H., Dao, P. A., & Ta, T. T. (2025). Planning craft villages in Hanoi towards green transformation, modern and sustainable development. *Journal of Architecture & Construction Science*, (58), 19–25.
- [11]. Nguyen, T. V. H. (2025). Factors affecting occupational inheritance in families in traditional craft villages in Vietnam: The case of Thanh Hoa province. *Journal of Human, Family and Gender Studies*, 2(02), 95–111.
- [12]. Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). The Free Press.
- [13]. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- [14]. Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.
- [15]. Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, EM-29(1), 28–45.
- [16]. Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186–204.
- [17]. Zhu, K., & Kraemer, K. L. (2005). Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence for the role of innovation diffusion, IT infrastructure, and competitiveness. *Information Systems Research*, 16(1), 61–84.

- [18]. Zhu, K., Kraemer, K. L., & Xu, S. (2003). Electronic business adoption by European firms: A cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems*, 12(4), 251–268.
- [19]. Zhu, K., Kraemer, K. L., & Xu, S. (2006). The process of innovation assimilation by firms in different regions: A technology-organization-environment perspective for the dynamics of net value. *Information Systems Research*, 17(1), 37–55.