

Factors Affecting E-Logistics Services: A Case Of Vietnam's Northern Key Economic Region

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ABSTRACT

Vietnam is one of the fastest-growing e-commerce markets in Southeast Asia. Vietnam's logistics industry, with an estimated total value of USD 50-60 billion, is increasing (20-25%/year) and is forecast to maintain double-digit growth for at least the next 5-10 years. This is due to the disruption of the retail industry with the high penetration of the internet and the trend of online shopping. With this boom, the demand for logistics in the e-commerce ecosystem is enormous. Research and analyze factors affecting e-logistics services. Since then, it has been urgent to propose strategic solutions for developing E-logistics in the Northern Key Economic Region according to the Project on Development of the Logistics Industry to 2025, with a vision of 2030.

Keywords: Logistics, E-logistics, Logistics services, E-commerce.

I. INTRODUCTION

As a country with the advantage of many deep-water ports, the logistics industry has not yet become a spearhead economic sector because of many limitations. The lack of infrastructure synchronization for the logistics industry has limited the development of logistics activities. Meanwhile, E-logistics is a tool and solution to synchronously connect infrastructure for logistics and e-commerce industries [1].

The Northern Key Economic Region has a developed logistics system and is the most important in the critical economic region of Vietnam. In the current period of international economic integration, the Northern key economic region needs to quickly build a program to develop logistics into a key economic sector, according to the Prime Minister's Decision on the Action Plan activities to improve competitiveness and develop Vietnam's logistics services by 2025 in the Northern key economic region [2].

However, i) The E-logistics connection model (as a coordination center combining logistics and e-commerce) has not yet been formed. The operation of the logistics and e-commerce industry has a distribution process of different goods/services, resulting in inefficiencies; ii) The satisfaction level of shoppers through e-commerce channels and online logistics services are still low [3].

2. LITERATURE REVIEW

The study uses information from related studies, reports, plans, and strategies in recent years of the Vietnam Logistics Association, the Vietnam E-commerce Association, and the leading experts and agencies in the Northern Key Economic Region.

Related studies, including 1) Domestic studies on the development of logistics services in our country in terms of international integration [4]; Experience in developing

logistics centers in some nations around the world and lessons for Vietnam [5]; Research and propose models and investment solutions to build a logistics center serving Hai Phong international gateway port at Lach Huyen [6]; Improving the quality of logistics services at Vietnamese transport enterprises in Hanoi [7]; State management of logistics services in Hai Phong port [8],... 2) Overseas research work of Charles et al. on building reference models of industrial logistics hubs for manufacturing economies [9]. Thereby synthesizing theoretical and practical bases on E-logistics and creating a research model of factors affecting e-logistics services.

3. METHODOLOGY

Research conducts an in-depth survey of 40 leaders of organizations, businesses, and related experts to determine the scale of factors affecting e-logistics services. Research builds a questionnaire for 479 survey subjects.

Descriptive statistical method: based on information and data collected from studies, reports, plans, and strategies to analyze and evaluate the current situation of E-logistics in the key economic region of the North, compare the indicators related to E-logistics in Vietnam's Northern Key Economic Region.

Qualitative research: the author builds a preliminary questionnaire and conducts mock interviews in front of 5 experts who are managers of agencies, departments, and businesses operating in logistics services and e-commerce in the Northern Key economic region. The method aims to discover, adjust and supplement the

observed variables and, at the same time, check the clarity of words, the ability to express, or the content duplication, if any, of the statements in the scale to make the appropriate adjustments. The qualitative research results are the basis for building the official interview questionnaire to test the scale consisting of 07 independent variables, with 29 observed variables, ensuring objectivity and justification for the research results.

Quantitative research: from the survey results of 479 survey questionnaires, the author uses SPSS 20.0 software to analyze the data and assess the impact of factors affecting E-logistics in the Northern key economic region.

Besides, the research is based on the analysis results of influencing factors; current situation of strengths, weaknesses, opportunities, and challenges for E-logistics; using the SWOT matrix to propose strategic solutions for E-logistics in the Northern key economic region.

3. RESULTS

3.1. Reliability statistics

The observed variables with Cronbach's Alpha reliability coefficient > 0.6 are in excellent measure (Table 1). The total correlation coefficients of the variables measuring this factor are all > 0.3 . Besides, the coefficient of Cronbach's Alpha, if excluding the variables of the variables, is smaller than the coefficient of Cronbach's Alpha, so the four variables measuring this factor are used in the subsequent analysis.

Table 1. Reliability statistics of the Scale

Variable	Cronbach's Alpha
Customer perception	0,820
Technology and security	0,919
Legal infrastructure	0,870

Intellectual property and consumer protection	0,868
Electronic payment system	0,910
Human Resources	0,909
Organization and administration	0,976

3.2. Kaiser-Meyer-Olkin test

KMO coefficient = 0.797 ($0.5 < KMO < 1$) is an index that compares the magnitude of the correlation coefficients between variables with their partial correlation coefficients. The Chi-Square statistic of Bartlett's test reached the value of 5358,578 with the Sig = 0.000 showing that the observed variables are correlated with each other on the overall scale. The results of the EFA analysis show that the total variance extracted is

79.965% (> 50%), which shows that these seven factors explain 79.965% of the variation of the data. This is an acceptable result and proves that grouping the elements together is appropriate. When extracting characteristics at factor 7 with Eigenvalues, the breakpoint is $1,555 > 1$, showing that the factor analysis results are relevant. Observable variables have a satisfactory factor loading factor > 0.5, and no observed variable has a simultaneous upload factor on both aspects, so the scales reach convergence values (Table 2).

Table 2. KMO and Bartlett’s Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.797
Bartlett’s Test of Sphericity	Approx Chi-Square	5352.578
	df	524
	Sig.	0.000

After analyzing the EFA discovery factor, retest the suitability of the scale using Cronbach's Alpha reliability coefficient. The results of the EFA analysis show that the observed variables after the Cronbach's Alpha reliability analysis are included in the EFA analysis. Those observed variables are still classified into the same factors initially proposed by the author scrambled variables. Based on the results of the EFA analysis, seven factors with 29 observed variables were drawn.

Then the elements are interpreted and renamed accordingly. The naming and interpretation of factors are based on recognizing observed variables with extensive factor loading in the same factor. Thus, this factor can be explained by variables with significant coefficients in it. The results of the EFA analysis show that the observed variables given by the

author for each factor remain the same, proving that the original set of observed variables measures the same concept related to the research problem. Hence, the author gives the new name the same as the original old name.

3.3. Linear regression analysis

Regression analysis aims to study the impact of 7 factors: (1) Customer perception; (2) Technology and security; (3) Legal infrastructure; (4) Intellectual property and consumer protection; (5) Electronic payment system; (6) Human resources; (7) Organization and administration to E-logistics. They use multiple regression equations to study the influence of independent variables X1, X2, X3, X4, X5, X6, and X7 on E-logistics Y. To analyze the regression equation, the author built it conveniently. The regression equation has the following form [10]:

$$Y_i = \beta_0 + \sum_{i=1}^n \beta_i A_i$$

In which:

- + Y_i : Result function - E-logistics activity
- + $\beta (0, i = 1 \div n)$: level of impact
- + A_i : A1 - Perception of customers; A2 - Technology and security; A3 - Legal infrastructure; A4 - Intellectual property and consumer protection; A5 - Electronic payment system; A6 - Human resources; A7 - Organization and management - are groups of factors affecting the development of E-logistics.
- + β_0 , β_i : Regression constant and coefficients of the regression equation of factors, i respectively ($i = 1, 2, 3, 4, 5, 6, 7$).

The study performed multivariate regression by Enter method: 7 independent and dependent variables were included once, and the statistical results related to the research problem were considered. After forming the dependent and seven independent variables in the regression, all the independent variables have Sig. >0.05, so seven variables are kept.

- Detect the violation of necessary assumptions in the regression model

Regression analysis is not just about describing observed data. Acceptance and

interpretation of regression results cannot be separated from the assumptions observed in the sample; one must infer conclusions from the relationship between variables and diagnoses of violations of those assumptions. If the premises are violated, the estimated results are no longer reliable [11].

- Assumption of error independence (No correlation between residuals)

The Durbin-Watson statistic can be used to test the correlation of adjacent errors. The results of Table 3 show that the Durbin-Watson statistical value of 1,979 is close to 2, which means accepting the assumption that there is no first-order series correlation between the residuals.

Table 3 on the Durbin-Watson test shows that the adjusted R square (R Square) coefficient is 0.764 smaller than the R square coefficient (R Square) 0.779 and is used to assess the model's fit. The model is safer because it doesn't inflate the model's fit. The adjusted R2 coefficient is $0.764 > 0.5$, which proves that the built linear regression model is consistent with the data to the level of 76.4%; the model has a pretty good group of explanations, and this still shows that the relationship between the dependent variable and the independent variables is quite close. Thus, the model explains 76.4% of the impact of factors affecting E-logistics; the rest is due to factors outside the model.

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.927 ^a	0.779	0.764	0.05404	1.979
a. Prediction: (Constant), A7. Organization and Administration, A5. Electronic payment system, A3. Legal infrastructure, A6. Human Resources, A4. Intellectual property and consumer protection, A2. Technology and Security, A1. Customer perception					

- No multicollinearity

The column of Multicollinearity Statistics with the Variance Inflation Factor (VIF) of the independent variables in the model all less than 2

proves that there is no multicollinearity phenomenon (Table 4).

Table 4. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
1	(Constant)	0.989	0.025		39.977	0.000		
	Customer perception	0.322	0.027	0.179	6.999	0.000	0.666	1.234
	Technology and security	0.333	0.029	0.368	13.884	0.000	0.866	1.543
	Legal infrastructure	0.422	0.028	0.479	6.379	0.000	0.869	1.765
	Intellectual property and consumer protection	0.029	0.023	0.186	1.001	0.000	0.955	1.978
	Electronic payment system	0.059	0.009	0.466	5.035	0.000	0.811	1.210
	Human Resources	0.068	0.015	0.255	5.579	0.000	0.857	1.654
	Organization and administration	0.050	0.015	0.666	5.088	0.000	0.866	1.198

- Check the fit of the model

The ANOVA analysis of variance (Table 5) gave the F-value with the Sig significance level. = 0.000 (<0.05) means that the regression model fits the collected data and the included variables are statistically significant at the 5% significance level. F = 50,039 statistic is used to test

hypothesis H0: Regression coefficient of independent variables $\beta_1 = \beta_2 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$ (no linear relationship between variables independent and dependent variable). The model has Sig. = 0.000 < 0.05, so null hypothesis H0. Thus, the independent variables in the model are related to the dependent variable.

Table 5. Anova

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.773	7	0.097	50.039	0.000 ^b
Within Groups	0.443	172	0.003		
Total	0.998	179			

a. Prediction: (Constant), A7. Organization and Administration, A5. Electronic payment system, A3. Legal infrastructure, A6. Human Resources, A4. Intellectual property and consumer protection, A2. Technology and Security, A1. Customer perception
b. Dependent variable: ELOGISTICS

- Regression

The authors chose the standardized regression coefficient (Beta coefficient) to write the regression equation based on the research objectives and content. With the results presented in Table 4, all variables are statistically significant for Sig values. = 0.000 (< 0.05). Thus, there are seven factors affecting E-logistics according to the standardized regression coefficient (Beta). Comparing the value of β , we see that factor "A2. Technology and security" have the greatest influence on E-logistics with $\beta^2 = 0.368$; The second and third influencing factors are "A1. Customer perception" with $\beta^1 = 0.179$ and "Legal infrastructure" with $\beta^3 = 0.479$; The fourth and fifth influencing factors are "Human Resources" with $\beta^6 = 0.255$ and "Electronic payment system" with $\beta^5 = 0.466$; The sixth influencing factor is "Organization and governance" with $\beta^7 = 0.666$, and the seventh influencing factor is "Intellectual property and consumer protection" with $\beta^4 = 0.186$.

From the above results, the equation shows the factors affecting E-logistics:

$$Y = 0.989 + 0.179*A1 + 0.368*A2 + 0.479*A3 + 0.186*A4 + 0.466*A5 + 0.255*A6 + 0.666*A7$$

Thus, the linear regression model built according to the Y equation does not violate the necessary assumptions in linear regression. Therefore, based on the regression analysis results, the author concludes that the hypotheses A1, A2, A3,

A4, A5, A6, and A7 are accepted at the 5% level of statistical significance, and the relationship between each factor with "ELOGISTICS" is proportional.

4. DISCUSSION

Based on the results of E-logistics research affected by 07 factors and analyzing the current situation, the research team proposes several strategic solutions for developing E-logistics services in the Northern key economic region.

4.1. Building an E-logistics model with the connection of e-commerce activities with multi-modal logistics in the trend of industrial revolution 4.0

Building an E-logistics model connecting e-commerce activities with multi-modal logistics in the industrial revolution 4.0 movement brings excellent opportunities for Vietnam's Northern key economic region. Industry 4.0 can shorten the process of industrialization and modernization by "taking a shortcut, taking the lead," developing leaps and bounds to higher technology.

In the E-Logistics Model, the E-logistics Center is the core element of the E-logistics system, which plays a vital role in the efficiency of E-logistics activities; Optimize stock levels, Ensure quality customer service; Minimum transit time of goods; Reducing E-logistics costs. Besides, the operation of the logistics center also needs to achieve socio-economic goals, such as

More effective supply chain management; Ensuring efficient transfer of goods transported by different modes of transport; Optimal use of national and international transportation systems; Supporting socio-economic development in regional, national and regional levels through effectively meeting E-logistics services for production and business of goods and services. The essential functions and tasks of an E-logistics center include: i) Connectivity and Transmission Solutions; ii) Warehousing solutions, iii) Loading and unloading solutions; iv) Consolidation solutions; v) Goods Separation Solutions, which is the opposite of consolidating - the solution of dividing large shipments into smaller ones; vi) Optimum stocking solutions, vii) Reverse logistics solutions,

In addition, the E-logistics Center is also a place to carry out customs procedures, customs clearance, inspection and control of goods, as well as other state management functions according to regulations for internal E-logistics activities and international E-logistics activities.

4.2. Promote investment in science and technology application according to the trend of forming the E-logistics industry, adopt policies to support investment capital for E-logistics enterprises, and encourage high-tech enterprises to participate.

From the policy of the Northern key economic region on the application of the Industrial Revolution, 4.0 is an opportunity for E-logistics and security technology, the application of logistics, and express delivery network connection to grow [12]. Invest in the technology of Virtual Reality (VR - Virtual Reality) and Augmented Reality (AR - Augmented Reality) connecting E-logistics. To improve the efficiency of E-logistics activities, and optimize the process, thereby enhancing the reliability of online transactions, The Internet of Things (IoT) can be

integrated into the warehouse through sensors installed on shelves and goods. In addition, artificial intelligence (AI) technology helps develop self-learning capabilities, serving analysis and making predictions in the industry. Therefore, it is necessary to promote investment in the application of science and technology, catch up with the international level, following the trend of forming the E-logistics industry. The Northern key economic region should have a policy to partially support investment capital for E-logistics enterprises and a policy to encourage high-tech enterprises to have a form of leasing so that industrial enterprises do not have to make a significant initial investment for technology.

4.3. Building a Logistics Center, combined with completing and synchronizing E-logistics infrastructure

Aware of the importance of the logistics service industry, the People's Committee of the Northern Key Economic Zone has developed a project to develop the logistics industry by 2025, with an orientation to 2030. Based on an assessment of the current situation and economic research with international experience, the project needs to provide practical solutions to develop logistics into a spearhead service industry, becoming the region's focal point and contributing to reducing logistics costs. Accordingly, the planning of the logistics industry should focus on infrastructure development, including determining the location and scale of the establishment of a logistics center to connect goods traffic between localities. This task must meet two requirements: The first is to store, transmit, and supply goods for inner-city distribution chains; The second is the transshipment and distribution of interests between the Northern Key Economic Region and the provinces and cities, and import and export goods through the city gateway [13].

4.4. Exploiting a centralized network of industrial enterprises with various online transactions to share and exploit industry resources.

Lack of capital and human resources are two primary factors that make domestic logistics enterprises less competitive than foreign ones. In addition, the application of information technology is still limited; most domestic logistics enterprises' websites lack the utilities that customers need, such as order tracking tools, tracking documents, viewing train schedules, and e-booking. Domestic enterprises are striving to upgrade the level of logistics service providers to 3PL, develop electronic logistics (E-logistics), and effective supply chain management. Some domestic enterprises have participated in the specific 3PL strategic model, such as Vinafco, Saigon Newport Corporation, Transimex, ITL, Gemadep, and Vinalink [14].

Thus, the Northern key economic region needs to strengthen the exploitation of the network of concentrated enterprises by establishing an E-logistics Center. They combine developing and applying science and technology in E-logistics with various online transactions to share and exploit industry resources.

3.3.5. Completing the law on E-logistics

Currently, logistics and e-commerce are comprehensive, covering many aspects of management. Therefore, a complete and strict legal corridor must be established to facilitate the development of E-logistics, e-commerce, and logistics services. Accordingly, it is necessary to promptly amend and supplement the contents of E-logistics in the Commercial Law, the Law on E-transactions towards the legalization of e-commerce, logistics, and E-logistics. In addition, many agencies are involved in management, but there is no joint governing body for E-logistics. To facilitate the development of these activities, the authority to manage logistics services should

establish an Inter-sector Coordination Committee on E-logistics (from relevant functional departments). This will help the management of the industry to be more effective, contributing to accelerating the development of the E-logistics service industry [16].

5. CONCLUSION

To develop E-logistics, it is necessary to pay more attention to the above seven factors, with details of the critical factors being: i) "Demand for online shopping and transactions"; ii) "Security of online transaction information"; iii) "Dispute settlement and settlement procedures"; iv) "Safety and confidentiality of guest information"; v) "Mode of payment suitable for customers"; vi) "Training human resources for the sector"; vii) "E-logistics distribution channel management.

Along with the current situation analysis, the research team proposed several strategic solutions for the development of E-logistics in the Northern Key Economic Region, including (1) Building an E-logistics model with the connection of activities e-commerce activities with multimodal logistics in the trend of the industrial revolution 4.0; (2) Promote investment in the application of science and technology according to the trend of forming the E-logistics industry; (3) Establish policies to support investment capital for E-logistics enterprises and encourage high-tech enterprises to participate; (4) Building a Logistics Center, combined with completing and synchronizing E-logistics infrastructure; (5) Exploiting a centralized network of industry enterprises, with various forms of online transactions, to share and jointly exploit industry resources.

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