

BARRIERS AFFECTING THE DEVELOPMENT OF LOGISTICS SYSTEMS IN VIETNAM IN THE PERIOD 2015-2021

Nguyen Thi Binh*, Le Tram Anh, Tran Thu Thao, Luu Thanh Truc

Foreign Trade University – Hanoi Campus, Vietnam

*Corresponding author: ntbinh@ftu.edu.vn

(Received: August 30, 2022; Revised: April 23, 2023; Accepted: May 16, 2023)

Abstract - The objective of this study is to analyze the barriers that have affected the development of Vietnam's logistics system during the period of 2015-2021 and propose solutions for the future growth of the country's logistics industry. To achieve the above goals, the authors conducted a comprehensive literature review of the barriers to Vietnam's logistics system. We then used content analysis to extract the necessary data for the Interpretive Structural Model (ISM) and the Cross-Impact Matrix Multiplication Applied to Classification method (MICMAC). The research results indicate that barriers related to customs procedures and infrastructure investment capital, and accessibility of logistics enterprises to governmental capital were the most crucial barriers to the development of Vietnam's logistics system from 2015 to 2021.

Key words - Logistics; barriers; Interpretive Structural Model (ISM); Vietnam

1. Introduction

Logistics plays a significant role in Vietnam's socio-economic development and enhances the country's competitiveness. From a broad perspective, the logistics system comprises several closely related elements, including the logistics infrastructure system, logistics service providers, service recipients, and the legal framework system [1]. Despite the value that logistics activities bring to the national economy, Blancas [2] notes several limitations in Vietnam's logistics industry. These limitations include the inability of logistics infrastructure to keep up with increasing freight transport demand, low connectivity between means of transportation, ineffective integration of e-commerce and logistics, and a low level of competitiveness among logistics companies. Consequently, the cost of logistics service in Vietnam is relatively high, equivalent to appropriate 25% of the country's GDP, compared to the neighboring countries [3], [4].

According to Banomyong [1], who conducted in-depth interviews with many experts in the logistics service industry, there were significant obstacles to the development of Vietnam's logistics system during the early stages of development from 2006 to 2012. Since then, the capacity of Vietnam's logistics system has notably increased. In 2018, the World Bank reported that Vietnam's logistics performance index (LPI) ranked 39th out of 160 countries, which was an improvement of 25 places compared to 2016 and ranked 3rd among ASEAN countries. Despite these achievements, Vietnam's logistics industry still faces many barriers that directly affect its sustainable development in this period. There are two main motivations for this study. Firstly, while factors that affect the development of logistics and supply chain management

have been recognized as contemporary research, the theoretical basis for logistics development is rarely viewed from a country's perspective. Most existing studies on a country's logistics system development focus on identifying factors or barriers that affect development without analyzing the degree of independence of each barrier. To address this gap, this study uses the ISM research model and the MICMAC method to clarify the barriers and their interaction level. The proposed research model has been widely used in clarifying barriers in various fields such as green supply chain management, international trade logistics, and reverse logistics [5], [6], [7]. Secondly, the Vietnamese government and enterprises recognize the need for an effective logistics system that can support freight transport flow throughout the country [8], [9]. However, they often lack insight into the nature of the limitation of the logistics system. To address these gaps, the objective of this study is to analyze the barriers affecting the development of the logistics system in Vietnam in the period 2015-2021 and propose solutions for the future development of Vietnam's logistics industry.

2. Overview of the logistics system and barriers affecting the development of the national logistics system

**The micro perspective of the logistics system and its elements at the national level*

According to Martin Christopher, "Logistics is the strategic management process of purchasing, moving, and storing raw materials, semi-finished products, finished products, and corresponding information flows through organizational channels. organization and its marketing to maximize current and future profits by fulfilling orders most cost-effectively" [10]. Sharing the same view, S. Wichaisri and A. Sopadang considered the logistics system as a pathway by which raw materials or products flow from a place of origin to a point of consumption which involves raw materials or commodities that are still being produced, connected to the point of usage [11]. A logistics system is composed of elements including: (i) Logistics infrastructure system; (ii) The parties involved in the operation and exploitation of the logistics system; (iii) Legal framework system; (iv) Human Resources; (v) The provision of logistics services [1].

An efficient logistics system offers numerous benefits to a nation's businesses and economy. Consequently, many researchers have employed various approaches to analyze the factors that influence the development of national logistics systems. Regulation, integration of logistics

services providers, infrastructure, and human development were identified as the most critical criteria for improving logistics systems by Kauppinen and Lindqvist [12].

In terms of infrastructure, Fechner has asserted that it has a significant impact on the development of national logistics activities [13]. Infrastructure is defined as a system of land and water routes, airports, seaports, and/or telecommunications networks located in a certain area. A system approach to logistics recognizes linear and nodal infrastructure as components of the logistics infrastructure. Banomyong, Thai, and Kum explained nodes that nodes are facilities in the national logistics system that served as a point of entry or exit for transported goods [14]. Examples of nodes include ports, warehouses, logistics centers, and packaging and sorting facilities. In addition, they also noted that linear infrastructures are links that connect nodes in the national logistics system, consisting of pipelines, roads, waterways, and airways. As for the legal framework, Banomyong, Thai, and Kum considered the institutional framework as a dimension to evaluate the performance of national logistics systems. According to their study, it includes regulations concerning imports and exports, financial regulation, registration and licensing of service providers, and customer procedures [14]. In terms of human resources, Dang and Yeo described and assessed it using four main criteria: The quality of the

labor force, experienced executive-level managers and directors, standards for logistics education, and funding for logistics research and development [9]. Kauppinen and Lindqvist also emphasized the need for human resources to develop in parallel with improving technology [12]. Regarding integration among logistics services providers, Dang and Yeo [9] described transportation services (sea, railway, and air and rail transport); value-added, warehouse, forwarding, and customs-related, among others. Banomyong, Thai, and Kum [14] noted that logistics services providers are the industry's driving force, and their capacities determine the likelihood that logistics will catalyze both domestic and foreign trade in a country [9], [12], [14].

** Factors affecting national logistics activities*

A significant number of researchers have focused on one of the four elements when assessing a national logistics system. However, there are limitations to this approach. To address it, the authors review literature from various studies related to the development of the Vietnam logistics system from different perspectives and summarized findings. For example, Duong provided insights into Vietnam's current situation and highlighted issues with inappropriate investment [8]. Nguyen and Crase identified a pressing issue that most of Vietnam's small and medium-sized enterprises (SMEs) lack technology (IT) and effective business plans [15].

Table 1. Summary of Barriers to the Development of Vietnam's logistics service industry

Symbol	Classification	Barriers	Source				
			Tongzon., Lee., [16]	Duong., [8]	Dang., Yeo., [9]	Pham., Nguyen., [17]	Ministry of Industry and Trade [18], [19], [20]
F1	Infrastructure	Lack of cargo ports		x	x		x
F2		Weak cross-sectoral connection		x			x
F3	Logistics services	Small and medium logistics entrepreneurs			x	x	
F4		Lack of customer belief				x	x
F5	Human resource	Labour limitation in quantity and qualifications		x	x	x	x
F6	Legal framework	Lack of knowledge about international legal framework related to logistics			x		x
F7		The legal basis for logistics unsynchronized with commercial commitments		x			x
F8	Custom procedures	Lack of cross-border coordination	x				
F9		Limited hours of operation at customs clearance	x				x
F10		Delays in customs procedures and inspections	x				
F11	Finance	Lack of investment		x			x
F12		Struggle to access government funding	x	x	x		
F13	License requirements	Lack of consistency in regulations	x	x			
F14	Competition	Direct competition with foreign company	x				x
F15	Technology	Limited in the application of information technology (IT)					x
F16		Entrepreneurs lack knowledge about the role of IT					x
F17	Other	Changes in cross-border traffic policy	x				
F18		Lack of lead enterprises		x			

Tongzon and Lee surveyed obstacles hindering the development of national logistics systems and assessed their impact on shipping and logistics enterprises in ASEAN countries [16]. Based on the results of this study, they have proposed strategies for enhancing the logistics service of each country. Duong also analyzed the Vietnam logistics service sector and compared its development strategies with other Southeast Asian countries to provide policy implications for sustainable logistics development in Vietnam [9]. While Dang and Yeo did not specifically address the challenges faced by Vietnamese logistics enterprises, that Vietnamese logistics enterprises are facing, they highlighted the impact of other obstacles on logistics activities in Vietnam [9]. More recently, Pham and Nguyen presented a comprehensive analysis of the current status of Vietnamese logistics activities in the context of Vietnam's deepening integration into the global economy [17]. Additionally, the Ministry of Industry and Trade of Vietnam publishes detailed reports on the state of the logistics development in Vietnam, providing up-to-date information on various topics and reflecting the actual state of the logistics industry.

The authors have compiled Table 1 based on literature in the field of Vietnam's logistics system development, which lists the barriers to the operation of Vietnam's logistics service industry. The collected data will be analyzed using Interpretive Structural Modeling (ISM) to determine the impact level of each barrier on the development of Vietnam's logistics service industry.

3. Research methods and data collection

3.1. Research method

After synthesizing from previous studies, the author used Interpretive Structural Modeling (ISM) developed by John Warfield (1973) to establish the correlation between variables that affect the development of logistics systems.

Structural modeling does not generate any additional information, but it helps visualize the relationships and hierarchy of elements in a problem. In this study, the ISM model was applied as follows:

Step 1: Identify barriers that impact the development of the logistics system in Vietnam.

Step 2: Conduct in-depth interviews with experts to establish the relationship between barriers.

Step 3: Build an interaction matrix, access matrix, and hierarchical barriers.

Step 4: Collect results and clarify the correlation between barriers to logistics activities.

Next, the authors used the MICMAC analysis tool (Cross-Impact Matrix Multiplication Applied to Classification) - cross-effect matrix multiplication - to evaluate the degree of independence or dependence of each barrier in the system. The obtained results help clarify the ability of a variable to affect or be affected by other barriers in the whole system.

3.2. Data collection

3.2.1. Secondary data collection

When studying the barriers to the development of Vietnam's logistics industry, there has not been much research focusing on a detailed analysis of the direct and indirect effects of these barriers on the development of the logistics industry. We initiated data collection for this study by building an analytical framework, identifying relevant keywords, and gathering data from reputable sources, such as:

- Time range: March 01, 2022 - April 01, 2022.

- Data collection: List of prestigious scientific journals of Vietnam recognized by the State Council of Professors: reports from the Ministry of Industry and Trade. International scientific journals from Google Scholar, and Scopus databases.

- Search syntax: Logistics barriers, logistics barriers in Vietnam, Vietnam logistics situation.

3.2.2. Primary data collection

To establish the relationship between identified barriers, the authors conducted in-depth interviews with 25 experts from 3 groups: (i) 11 experts coming from forwarding companies, (ii) 7 experts coming from universities that have major specialized in logistics and supply chain management, (iii) 7 experts coming from governmental agencies in transport and logistics. The selection of these experts was based on their expertise in logistics and supply chain management theories and practical experience. Triangulation was used in the expert selection process, which means that experts from different backgrounds were consulted to ensure a diverse range of opinions.

Expert opinions were crucial for the ISM approach, and the first group (i) included managers and staff from four main companies namely Vinamilk (foreign trade department and import-export department), Piaggio Group in Asia Pacific (supply chain department), OEC Group – Hanoi branch (sea export department) and Hung Thai Ltd. The second group (ii) included PhDs and Masters in Logistics and Supply chain management majors from Foreign Trade University, Hanoi University of Science and Technology, and University of Transport and Communications. The third group (iii) included officers, senior advisors, and specialists from the Ministry of Transport, Ministry of Industry and Trade, Vietnam Logistics Business Association, and Railway Transport Operations Center.

The authors updated and restructured the criteria for expert selection, questionnaire design, and survey method to match the survey object and nature. The specialized interviews were conducted by sending letters of recommendation and invitations to the experts; emailing the research proposal to the expert; making an appointment and conducting face-to-face meetings and interviews. The average interview time for each expert was 45-60 minutes, and all information provided by experts was committed to be used for research purposes only.

4. Results and discussion

4.1. Analysis of the correlation of barriers

Through the in-depth interview survey with experts, the team has drawn an interaction matrix between barriers called the Structural self-interaction matrix (SSIM) as follows.

Note:

- V: Barrier i will alleviate barrier j;
- X: Barriers i and j will alleviate each other.
- A: Barrier j will alleviate barrier i;
- O: Barriers i and j are not related.

Table 2. Structural self-interaction matrix (SSIM)

Barrier j →	F18	F17	F16	F15	F14	F13	F12	F11	F10	F9	F8	F7	F6	F5	F4	F3	F2	F1
Barrier i ↓																		
F1	O	O	O	O	O	O	A	A	O	O	O	O	O	O	O	V	X	
F2	X	X	O	X	V	A	O	A	O	O	X	A	A	A	V	A		
F3	O	O	O	O	A	O	O	A	O	O	O	O	O	A	X			
F4	A	O	O	A	O	O	A	O	O	A	O	O	A	A				
F5	X	O	X	X	V	O	O	X	O	O	O	X	A					
F6	V	O	O	X	V	O	O	O	O	O	V	X						
F7	O	O	O	O	V	X	O	O	O	O	X							
F8	X	X	A	A	X	X	O	O	O	O								
F9	O	X	O	X	V	O	O	O	X									
F10	O	O	O	X	V	X	O	O										
F11	X	O	X	V	V	O	X											
F12	O	O	O	X	V	O												
F13	O	O	O	O	V													
F14	A	O	A	A														
F15	O	O	A															
F16	O	O																
F17	O																	
F18																		

Source: Authors

4.2. Reachability matrix

To support the hierarchy of barriers, the model will be converted to a binary matrix by replacing the characters V, X, A, O with the values 0 and 1 using the following rule:

- If the (i; j) entry in the SSIM is V, the (i; j) entry in the reachability matrix changes into, and (j; i) changes into 0.
- If the (i; j) entry in the SSIM is A, the (i; j) entry in the reachability matrix changes into 0, and (j; i) changes into 1.
- If the (i; j) entry in the SSIM is X, the (i; j) entry in the reachability matrix changes to 1, and (j; i) changes to 1.
- If the (i; j) entry in the SSIM is O, the (i; j) entry in the reachability matrix changes to 0, and (j; i) changes to 0.

In ISM structural modeling, there is a transitive property as follows: If barrier A affects barrier B, and barrier B affects barrier C, then barrier A will also affect barrier C. This property is denoted as follows:

$$\begin{aligned} &\text{If } A \rightarrow B \\ &\quad B \rightarrow C \\ \Rightarrow &A \rightarrow C \end{aligned}$$

Based on that, the authors can build the final reachability matrix.

4.3. Hierarchy of elements

The ISM model is a methodology used to identify and analyze the barriers that prevent a system from achieving its goals. The model consists of three sets: Reachability, Antecedent, and Intersections:

- Reachability includes the variables that a barrier can affect, while Antecedent includes the barriers that affect a particular variable (column j).
- The intersection between the elements of Reachability and Antecedent forms the set of Intersections, which represents the correlation between the barriers and variables in the system.

- In the first hierarchy, if a barrier is included in Reachability I and Antecedent (A), it will be considered at the level I. In subsequent hierarchies, all barriers at the previous level will be removed, and the same rule will be applied until all barriers have been assigned to a level.

By applying this rule, the authors have decentralized the barriers, meaning that they have distributed them among different levels based on their relationships with other barriers and variables in the system. This approach allows for a more comprehensive analysis of the system and its barriers, which can help identify potential solutions and improvements.

Table 3. Final reachability matrix

Barrier j →	F18	F17	F16	F15	F14	F13	F12	F11	F10	F9	F8	F7	F6	F5	F4	F3	F2	F1	DrP
Barrier i ↓																			
F1	1*	1*	0	1*	1*	0	0	0	0	0	1*	0	0	0	0	1	1	1	8
F2	1	1	0	1	1	1*	0	0	0	1*	1	0	1*	1*	1	1*	1	1	13
F3	1*	1*	0	1*	1*	0	0	0	0	0	1*	0	0	0	1	1	1	1*	9
F4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1*	0	3
F5	1	1*	1	1	1	0	0	1	1*	0	1*	1	1*	1	1	1	1	1*	15
F6	1	1*	1*	1	1	1*	0	1*	0	0	1	1	1	1	1	1*	1	0	14
F7	1*	1*	1*	1*	1	1	0	0	0	0	1	1	1	1	1*	0	1	1*	13
F8	1	1	0	0	1	1	0	1*	1*	1*	1	1	1*	1*	1*	0	1	0	13
F9	0	1	0	1	1	1*	0	0	1	1	1*	0	1*	1*	1	1*	1*	0	12
F10	0	1*	0	1	1	1	0	0	1	1	1*	0	1*	1*	1*	1*	1*	0	12
F11	1	1*	1	1	1	0	1	1	1*	0	1*	0	1*	1	1*	1	1	1	15
F12	1*	0	1*	1	1	0	1	1	0	0	1*	0	0	1*	1	1*	1*	1	12
F13	1*	1*	0	1*	1	1	0	0	1	0	1	1	0	0	1*	0	1	1*	11
F14	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1*	1	1*	0	5
F15	0	0	0	1	1	0	1	0	1	1	1	0	1	1	1	1*	1	0	11
F16	0	0	1	1	1	0	1*	1	0	0	1	0	1*	1	1*	0	1*	0	12
F17	0	1	1*	1*	1*	1*	0	0	0	1	1	1*	0	0	0	1*	1	0	9
F18	1	0	1*	1*	1	1*	1*	1	0	0	1	1*	0	1	1	1*	1	0	13
DP	11	12	8	15	17	9	5	7	8	7	17	7	10	12	16	13	18	8	

Source: Authors

Note: (1*) represents a transitive relationship, meaning that if Barrier A affects Barrier B, and Barrier B affects Barrier C, then Barrier A indirectly affects Barrier C.

(1) represents the existence of a correlation between the two barriers, meaning that Barrier A and Barrier B are related in some way.

(0) represents that there is no correlation between the two barriers, meaning that Barrier A and Barrier B are not related.

(DP) is an abbreviation for "Dependence Power", which is a measure of how much a barrier depends on other barriers in the system.

(DrP) is an abbreviation for "Driving Power", which is a measure of how much a barrier influences other barriers in the system.

Table 4. Synthesis of the set of approaches, set of premises, and hierarchy of barriers

Barriers	Reachability (R)	Antecedent (A)	Intersection (I)	Level
1	1,2,3,8,14,15,17,18	1,2,3,5,7,11,12,13	1,2,3	VI
2	1,2,3,4,5,6,8,9,13,14,15,17,18	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	1,2,3,4,5,6,8,9,13,14,15,17,18	I
3	1,2,3,4,8,14,15,17,18	1,2,3,4,5,6,9,10,11,12,14,15,17,18	1,2,3,4,14,15,17,18	I
4	2,3,4	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,18	2,3,4	I
5	1,2,3,4,5,6,7,8,10,11,14,15,16,17,18	2,5,6,7,8,9,10,11,12,15,16,18	2,5,6,7,8,10,11,15,16,18	VII
6	2,3,4,5,6,7,8,11,13,14,15,16,17,18	2,5,6,7,8,9,10,11,15,16	2,5,6,7,8,11,15,16	VIII
7	1,2,4,5,6,7,8,13,14,15,16,17,18	5,6,7,8,13,17,18	5,6,7,8,13,17,18	VII
8	2,4,5,6,7,8,9,10,11	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16,17,18	2,5,6,7,8,9,10,11	II
9	2,4,5,6,7,8,9,10,11,13,14,17,18	2,8,9,10,15,16,17	2,8,9,10,17	XI
10	2,3,4,5,6,8,9,10,13,14,15,17	5,8,9,10,11,13,15,16	5,8,9,10,13,15	IX
11	1,2,3,4,5,6,8,10,11,12,14,15,16,17,18	5,6,8,11,12,16,18	5,6,8,11,12,16,18	X
12	1,2,3,4,5,8,11,12,14,15,16,18	11,12,15,16,18	11,12,15,16,18	VIII
13	1,2,4,7,8,10,13,14,15,17,18	2,6,7,8,9,10,13,17,18	2,7,8,10,13,17,18	VII
14	2,3,4,8,14	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16,17,18	2,3,8,14	II
15	2,3,4,5,6,8,9,10,12,14,15	1,2,3,5,6,7,9,10,11,12,13,15,16,17,18	2,3,5,6,9,10,12,15	III
16	2,4,5,6,8,11,12,14,15,16	5,6,7,11,12,16,17,18	5,6,11,12,16	IV
17	2,7,8,9,13,14,15,16,17	1,2,3,5,6,7,8,9,10,11,13,17	2,7,8,9,13,17	V
18	2,3,4,5,7,8,11,12,13,14,15,16,18	1,2,3,5,6,7,8,11,12,13,18	2,3,5,7,8,11,12,13,18	V

Source: Authors

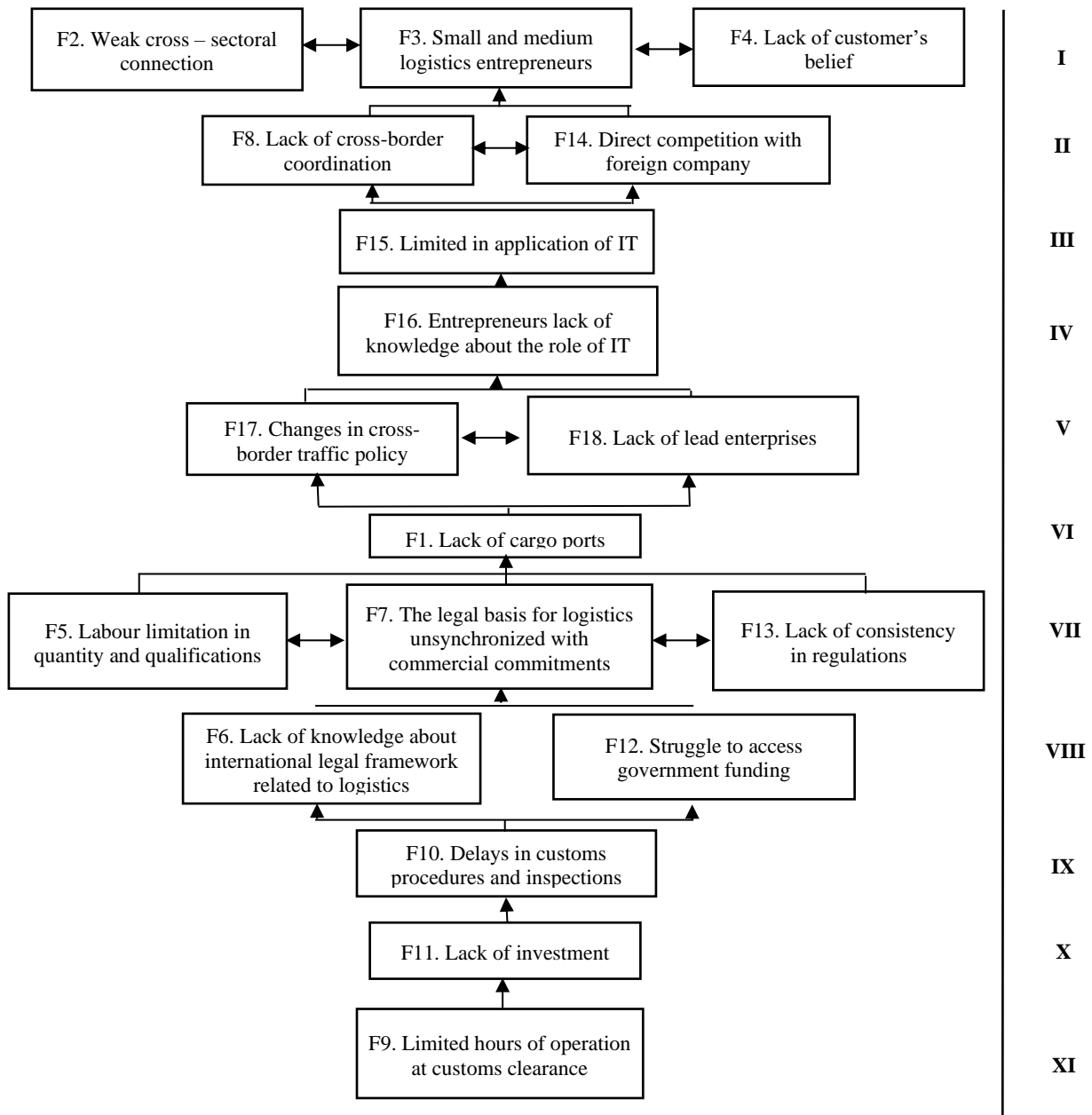


Figure 1. Structural modeling of barriers affecting logistics activities in Vietnam (Source: Authors)

From the above hierarchical results, the diagram represents the hierarchical relationship between barriers affecting logistics activities in Vietnam is formed with the following general rule: The arrow will point upwards from the variable with the highest hierarchy to the lowest (level I). This means that the variables at the higher levels have a greater influence on the variables at the lower levels. Variables that are at the same hierarchy level will be connected by two-way arrows, which indicate that they have a mutual influence on each other. The diagram is a visual representation of the ISM model, which helps to better understand the relationships between the barriers and variables in the system. By analyzing the diagram, the authors can identify the key barriers that need to be addressed to improve logistics activities in Vietnam.

4.4. MICMAC analysis and discussions

The final approach matrix is used to assist the

MICMAC analysis, which classifies the degree of dependency and independence of each barrier. The authors calculate the level of dependence (DrP) and the degree of independence (DP). Barriers are classified into four clusters:

Group I: Autonomous barriers, which are unaffected by any other barriers.

Group II: Dependence barriers, which are easily affected and difficult to be affected by other barriers.

Group III: Linkage barriers, which are both dependent and easily influence others. Any barrier that one group erects against another has a significant influence and impact on itself.

Group IV: Driving barriers, which are highly independent or less dependent on other groups.

The MICMAC model is then built as below:

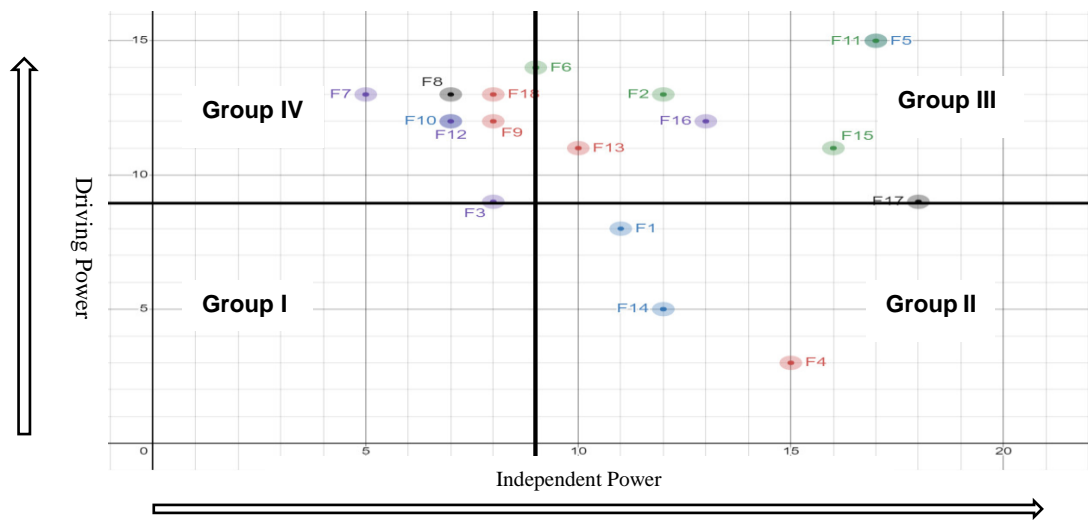


Figure 2. Distribution of barriers by group (Source: Authors)

Figure 2 indicates that all barriers have interactions with one another, except for those in group I, which are considered insignificant and unrelated to other barriers. Barriers such as lack of cargo ports, low level of customer confidence in logistics services, and direct foreign competition in Vietnam's market belong to Group II, which implies that they tend to be impacted by other barriers. It is evident that customer trust or competition with foreign companies are objective issues that businesses in the industry face. Therefore, improving the quality of logistics services is considered a viable solution to overcome this barrier. The import and export turnover and growth rate in the logistics service industry has a positive correlation, indicating the importance of the logistics industry's development in the country's trade growth. However, Vietnamese logistics companies mainly operate in the domestic market or a few countries in the region, and act as agents or undertake specific stages for international logistics enterprises such as customs clearance, vehicle rental, and warehousing [20]. As a result, most of these logistics enterprises are small and medium-sized. On the other hand, foreign companies dominate the market share in logistics services in Vietnam [21]. This situation poses a significant challenge as the country's import-export activities continue to grow, domestic trade expands, and the demand for logistics services increases. To overcome these barriers and achieve success in the logistics industry, small and medium enterprises must expand their domestic market share.

Group III is the group that is both impacted by the effects of the other groups and impacts those groups in turn. In the period between 2015 and 2021, the development of logistics activities in Vietnam has been hindered by several barriers. These include restricted investment capital, limited use of information technology, insufficient qualified and underqualified human resources, and incomplete understanding of the function of IT applications by businesses. Additionally, the infrastructure for logistics activities is poor and lacks synchronization, which has resulted in the logistics costs of Vietnam being much higher than that of other countries. Small-scale logistics enterprises, fragmented operations, and a lack of professionalism have also contributed to the low competitiveness of Vietnam's logistics industry. Although cooperation and linkage could create more competitiveness, these efforts are still very weak in Vietnam's

logistics service market. This creates a bad precedent for foreign enterprises to dominate the nascent logistics market of Vietnam. Another issue is the shortage of well-trained and qualified logistics human resources. The legal environment is also still inadequate with differences in the legal system, customs clearance of goods, and administrative procedures also posing challenges to the country in logistics integration [21]. These barriers directly affect those in group II. Improving the level of customer confidence in logistics services and addressing the presence of direct foreign competition in the Vietnam market can only be achieved if the business themselves change. Furthermore, investment capital is an essential factor in solving the lack of cargo ports.

Group IV barriers to the development of logistics activities in Vietnam include the legal basis for logistics not being synchronized with commercial commitments, a lack of cross-border coordination, limited hours of operation at the customs clearance, customs procedures, and inspections, the absence of leading Vietnamese logistics enterprises in the market, and difficulties for enterprises to access government funding. These barriers tend to impact other barriers, such as delays in the customs process, which have significantly reduced customers' confidence in Vietnam's logistics services in recent years. In addition, small and medium logistics entrepreneurs (barrier 3) are situated on the boundary between groups IV and I, suggesting that the size of small logistics enterprises is not a significant barrier to the development of logistics enterprises and Vietnam's logistics system. However, in the long term, the failure of firm size to improve commensurate with the overall development of the industry can be an issue that can affect the efficient and sustainable development of the industry.

5. Conclusion

The research investigates the factors associated with the barriers to the development of Vietnam's logistics service industry in the period 2015-2021. The study also classified, hierarchized, and clarified the correlation between all barriers. Based on the ISM structure diagram in Figure 1, delays in customs procedures and inspections or limited hours of operation at customs clearance were situated at the lowest

level of the hierarchy, indicating that this risk factor had a more significant impact than other barriers. The findings indicate that customs procedures and inspections or limited hours of operation at customs clearance are the most critical barriers to Vietnam's logistics development in the period 2015-2021. This barrier has a significant impact on other factors in the operation of the logistics system and needs to be addressed urgently. In addition, the lack of investment capital for logistics infrastructure (such as cargo ports and logistics centers) and the unprofessional operation of logistics service enterprises are also barriers that contribute to Vietnam's logistics costs being very high compared to many countries in the region and worldwide. As a result, these barriers inhibit the development of Vietnam's logistics system in the medium period. Furthermore, these barriers are also one of the reasons that limit the ability to attract domestic and foreign capital to invest in this field.

Moreover, the logistics service enterprises in Vietnam have limited application of Information Technology, and cross-border traffic policies (such as those at the border gates between Vietnam and China), where border gates can be opened and closed at any time have become a challenge for Vietnam's import-export and logistics activities. To address this issue, management agencies and businesses need to constantly diversify their markets to avoid dependence on one or a few markets. Vietnam's participation in a series of new-generation FTAs is also one of the solutions to overcome the above barriers. The remaining barriers to the development of Vietnam's logistics system, such as weak multi-modal linkages, small and medium logistics entrepreneurs, low customer confidence in the service, or low capacity, are assessed by experts as not having too much influence on the development of the logistics industry in recent years. The results of this study will provide more solid evidence and a basis for making policy suggestions to promote the development of Vietnam's logistics industry in the new context.

While this research has achieved the set goal, there are limitations to be acknowledged. Firstly, the study focuses on the directional flow of knowledge from the experts and has yielded contradictory results on the interrelationship of components. While the final findings represent the majority view, these may change with updates to the export file. Moreover, the study does not provide specific recommendations for the logistics system, and many aspects that affect it are dismissed due to the study's narrow focus. To address these gaps, future research could examine mobility factors in logistics, and consider various research methods, including quantitative analyses and specialized studies on contributing variables, to generalize findings across different scenarios. A small number of participating experts and regional differences in the characteristics of the national logistics system require a more detailed comparison.

The authors' next research direction is to develop a quantitative model to examine the impact of constraints on the development of the logistics sector and explore risk management issues in managing Vietnam's logistics system. With the insights gained from this research, the authors aim to propose a comprehensive set of solutions to reduce

logistics costs, enhance the efficiency and competitiveness of goods, and ultimately boost the Vietnamese economy.

REFERENCES

- [1] R. Banomyong, "Logistics Development in the North-South Economic Corridor of the Greater Mekong Subregion", *Journal of GMS Development Studies*, Vol. 4, pp. 43-57, 2008.
- [2] L. C. Blancas, J. Isbell, M. Isbell, H. J. Tan, and W. Tao, *Efficient Logistics: A Key to Vietnam's Competitiveness*, Washington, DC: World Bank, 2014.
- [3] N. Y. Nhi, L. N. Phuong, N. T. Phuong, N. M. Quang, and N. V. Quan, "Current situation of Vietnam Logistics before and during the COVID-19 pandemic", OSF Preprints, 2022.
- [4] OECD, "OECD Competition Assessment Reviews: Logistics Sector in ASEAN", *Organisation for Economic Co-operation and Development*, 2021, [Online] Available: <https://www.oecd.org/competition/fostering-competition-in-asean.htm>, [Accessed: February 2, 2023].
- [5] J. Arvind and A. Mohd, "Analysis of the Barriers for Implementing Green Supply Chain Management Practices: An Interpretive Structural Modeling Approach", *ScienceDirect*, 2014, [Online] Available: <https://www.sciencedirect.com/science/article/pii/S187705814035292>, [Accessed: February 2, 2023].
- [6] S. Shekhar and A. Kesharwani, "Analyzing the Barriers to International Trade Logistics from Indian Perspective: An ISM Modelling Approach", *Academy of Marketing Studies Journal*, Vol. 25, No. 6, pp. 1-6, 2021.
- [7] D. Tiwari, K. K. Shukla, and U. A. Khan, "To Find the Effectiveness of Barriers in Reverse Logistics by Using ISM", *Advances in Intelligent Manufacturing*, 2020, pp. 81-91.
- [8] D. A. Minh, "The status quo of Vietnam's logistics, the opportunities and challenges to become the regional transshipment hubs", World Maritime University Dissertations, 2016.
- [9] V. L. Dang and G. T. Yeo, "Weighing the Key Factors to Improve Vietnam's Logistics System", *The Asian Journal of Shipping and Logistics*, vol. 34, no. 4, pp. 308-316, 2018.
- [10] M. Christopher, "Logistics & Supply Chain Management", America: Financial Times Prentice Hall, 2011.
- [11] S. Wichaisri and A. Sopadang, "Sustainable logistics system: A framework and case study", *2013 IEEE International Conference on Industrial Engineering and Engineering Management*, 2013, pp. 1017-1021.
- [12] T. J. Kauppinen et al., "Elements for European logistics policy: a discussion paper". Ministry of Transport and Communications of Finland, 2006.
- [13] I. Fechner, "Role of Logistics Centres in National Logistics System", *Electronic Scientific Journal of Logistics*, vol. 6, no. 2, pp. 9-18, 2010.
- [14] R. Banomyong, V. V. Thai, and K. F. Yuen, "Assessing the National Logistics System of Vietnam", *The Asian Journal of Shipping and Logistics*, vol. 31, no. 1, pp. 21-58, 2015.
- [15] P. Nguyen, L. Crase, "Vietnam's state-owned enterprise reform: An empirical assessment in the international multimodal transport sector from the Williamson's TCE perspective", *Asia Pacific Journal of Marketing and Logistics*, vol. 23, no. 3, pp. 411-422, 2011.
- [16] J. L. Tongzon, S. Y. Lee, "Achieving an ASEAN Single Shipping Market: Shipping and Logistics Firms' Perspective", *Maritime Policy & Management*, vol. 43, no. 4, pp. 407-419, 2015.
- [17] P. N. M. Linh and N. T. T. Huong, "The Supply Chain and Logistics of Vietnam in the Context of International Economic Integration", *International Business Research*, vol. 13, no. 7, pp. 27-44, 2020.
- [18] Ministry of Industry and Trade, "Vietnam Logistics Report. Logistics: From plan to action", Publishing House for Industry and Trade, 2017.
- [19] Ministry of Industry and Trade, "Vietnam Logistics Report. Logistics and E-commerce", Publishing House for Industry and Trade, 2018.
- [20] Ministry of Industry and Trade, "Vietnam Logistics Report. Logistics: Enhance the value of agricultural products", Publishing House for Industry and Trade, 2019.
- [21] M. L. Loi, "Opportunities and challenges for Vietnam's logistics service industry in the context of deep integration", *Transport Magazine*, 2018, [Online] Available: <https://tapchigiaothong.vn/co-hoi-va-thach-thuc-cho-nganh-dich-vu-logistics-viet-nam-trong-boi-can-hoi-nhap-sau-18355882.htm>, [Accessed: February 2, 2023].