

# Some recommendations to reduce national logistics costs in Vietnam

Tran, Nguyen Hop Chau<sup>1</sup> - Luong, Van Dat<sup>1</sup>

<sup>1</sup> International Business Faculty, Banking Academy of Vietnam

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**Abstract:** Logistics is an important service sector in the overall structure of the national economy, playing the role of supporting, connecting and promoting socio-economic development of the country as well as each locality. By using the method of analysis and synthesis, this paper examines the logistics costs in Vietnam during the period from 2014 to 2020, based on the data obtained from literature in the past and some international reports on logistics costs. According to several World Bank's reports on logistics costs and the Logistics Report of the Ministry of Industry and Trade (MOIT, 2020), logistics costs as a percentage of GDP in Vietnam is still high compared to many countries in the world. Reducing logistics costs becomes a strategic solution to reduce business costs and increase competitiveness for the

## Giảm chi phí logistics tại Việt Nam

**Tóm tắt:** Logistics là một ngành dịch vụ quan trọng trong cơ cấu tổng thể của nền kinh tế quốc dân, có vai trò hỗ trợ, kết nối và thúc đẩy phát triển kinh tế - xã hội của đất nước cũng như của từng địa phương. Bằng việc sử dụng phương pháp phân tích và tổng hợp, bài báo nghiên cứu chi phí logistics ở Việt Nam trong giai đoạn 2014-2020, dựa trên số liệu thu được từ các nghiên cứu trước đây và một số báo cáo quốc tế về chi phí logistics. Theo một số báo cáo của Ngân hàng Thế giới về chi phí logistics và Báo cáo Logistics của Bộ Công Thương (MOIT, 2020), chi phí logistics tính theo phần trăm GDP ở Việt Nam vẫn còn cao so với nhiều nước trên thế giới. Giảm chi phí logistics trở thành giải pháp chiến lược nhằm giảm chi phí kinh doanh và tăng khả năng cạnh tranh cho quốc gia nói chung và doanh nghiệp nói riêng (United Nations, ESCAP, 2002); và đây là cơ sở để hoạch định các chính sách quốc gia, phát triển và xây dựng cơ sở hạ tầng (Farahani et al. 2009, 58). Tuy nhiên, việc giảm chi phí logistics có thể ảnh hưởng đến doanh thu của các doanh nghiệp logistics Việt Nam, do đó, bài báo đưa ra một số giải pháp nhằm giảm chi phí logistics tại Việt Nam theo hướng nâng cao hiệu quả hoạt động logistics.

**Từ khóa:** chi phí, logistics, LPI, Việt Nam

**Trần Nguyễn Hợp Châu**

Email: chautnh@hvn.edu.vn

**Lương Văn Đạt**

Email: datlv@hvn.edu.vn

Khoa Kinh doanh quốc tế, Học viện Ngân hàng

*country in general and businesses in particular (United Nations, ESCAP, 2002); and this is the basis for making national policies, developing and building infrastructure (Farahani et al. 2009, 58). However, reducing logistics costs can affect the revenue of Vietnamese logistics enterprises, so this paper provides some solutions to reduce logistics costs in Vietnam in the direction of improving efficiency of logistics activities.*

**Keywords:** *Costs, Logistics, LPI, Vietnam*

## 1. Introduction

Logistics is an important service sector in the overall structure of the national economy, playing the role of supporting, connecting and promoting socio-economic development of the whole country as well as each locality. Nowadays, the scope of logistics has extended beyond the traditional framework of logistics operations, which not only includes warehousing and freight forwarding, but also covers production planning, supply chain management of raw materials/semi-products/finished products from the point of suppliers to the point of end users. Logistics creates the connection in the whole society by introducing optimal solutions, reducing transportation and storage costs. The development of specialization and globalization in production and consumption is promoting international logistics. The ability to provide logistics services effectively is not merely an evaluation criterion among enterprises, but is leveraged to become one of the factors of assessing national competitiveness. Reducing logistics costs becomes a strategic solution to reduce business costs and increase competitiveness for the country in general (United Nations, ESCAP, 2002); and this is the basis for making national policies, developing and building infrastructure (Farahani et al. 2009, 58).

According to the 2020 Vietnam Logistics Report, the logistics costs in 2018 com-

prise of 16.8% in Vietnam and of 12.7% in the Asia-Pacific region (MOIT, 2020). This rate of Vietnam is higher than the region, showing that the logistics costs incurred by Vietnamese enterprises are higher than the average logistics costs that counterparts in the region have to spend. On the other hand, the majority of import-export companies in Vietnam have to use transportation services (especially in sea transport) provided by foreign logistics enterprises, because Vietnam currently has almost no container fleet. Vietnam-owned container ships are in charge of about 10% of the market share of transportation services and mainly provide services on short-haul routes like China, Japan, South Korea and Southeast Asia (MOIT, 2020). Only a few Vietnamese bulk carriers have transported cargo on the European routes. Thus, most of the logistics expenses that Vietnamese businesses spend fall into the pocket of foreign logistics enterprises, instead of contributing to Vietnam's GDP. As a result, the Government of Vietnam has many strategic plans such as the Action Plan for improvement of competitiveness and development of Vietnam's logistics services by 2025 in Decision No. 200 /QĐ-TTg dated 14/02/2017, including the goal of reducing logistics costs in the direction of improving logistics performance in Vietnam.

By using the method of analysis and synthesis, the authors examine the logistics

costs in Vietnam during the period from 2014 to 2020 based on the data obtained from literature in the past and some international reports on logistics costs. Specifically, in the study of Karri Rantasila & Lauri Ojala (2012), knowledge and data on the country-level logistics costs worldwide was discussed. On the project conducted by Advance Logistics Group Consulting (ALG Consulting) of World Bank, the goal is to support businesses and farmers to gain market access in the Mekong Delta River by reducing geographical and institutional obstacles in transporting goods on the main routes in the region (Ministry of Transport, 2014). Another significant research on logistics costs is implemented by MOIT (2019), which gives some policies for the government and solutions for businesses to improve logistics costs in Vietnam. In addition, there are some international reports investigating the logistics industry in Vietnam such as the report of Yin et al., (2019) and the 2020 Vietnam Logistics report issued by MOIT. From these, the authors have identified reasons why Vietnam's logistics costs are higher than the costs of many other countries in the world, and have given some recommendations to reduce logistics costs by optimizing efficiency of logistics activities.

This study is structured in 4 sections:

*Section 1:* Introduction (including the research imperative, methodology, and research objectives)

*Section 2:* Overview of logistics costs

*Section 3:* Logistics costs in Vietnam

*Section 4:* Conclusions and Recommendations

## **2. Overview of logistics costs**

Logistics costs can be approached from

a business perspective or from a national perspective. For businesses, logistics costs are collected to serve internal purposes (e.g. calculating costs, making management decisions), or external purposes (e.g. competitive advantage, calculating taxes), and are usually measured as a percentage of sales/total costs/selling prices. This calculation cannot be stereotyped when calculating logistics costs at the country level. The data and methods used to measure logistics costs at the firm level do not provide sufficient information for estimating national logistics costs (Karri Rantasila & Lauri Ojala, 2012). Within the scope of this paper, the authors focus on the national logistics costs. Currently, there is no set of criteria to measure this cost that are widely accepted and used worldwide. Therefore, there are various different perspectives on national logistics costs from the viewpoints of researchers/organizations/countries.

In the Logistics Report of MOIT (2020), “national logistics costs are the total costs that businesses (including all business entities in economy) spend on logistics activities, which include many different categories depending on the formulas method of each country, for example: transportation, administration, storage, handling, packaging, communications, customer service, etc.”

In the OECD Report (Organization for Economic Cooperation and Development), Karri Rantasila and Lauri Ojala (2012) summarized the components of logistics costs mentioned in the past studies as well as in the logistics reports of countries as follows (Table 1).

Due to the difference in the way of calculation among different countries, the components of these logistics costs may vary. However, in general, the main components

**Table 1. Summary of logistics-cost components**

Nation	S- Africa	Switzerland	Korea	Netherlands	Thailand	Canada	Morocco	China	United States	Count
Year of publication	2001	2011	2010	2009	2009	2008	2006	2008	2011	
Cost components										
Transportation	x	x	x	x	x		x	x	x	8
Administration	x		x	x	x	x	x	x	x	7
Inventory carrying	x		x	x	x	x	x	x	x	7
Warehousing	x	x	x	x			x			5
Cargo handling		x	x				x			3
Transport pack.			x				x	x		3
Communication							x			1
Customer service							x			1
Documentation							x			1
Equipment							x			1
Information			x							1
Insurance							x			1
Internal logistics costs						x				1
Internal services							x			1
Obsolescence							x			1
Outsourced logistics costs						x				1
Other logistics		x								1
Plan/management				x						1
R&D							x			1
Shipper related									x	1

Source: Karri Rantasila and Lauri Ojala (2012)

that make up the national logistics costs are below:

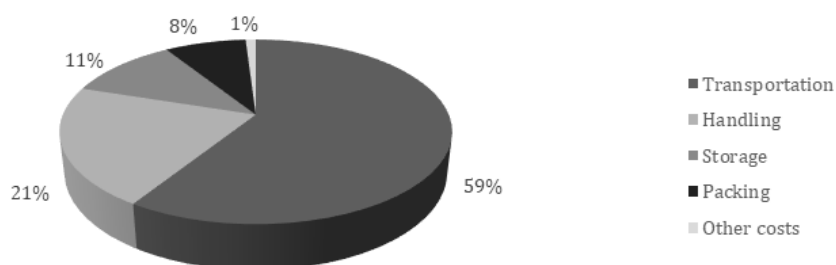
Transportation costs (inbound and out-bound of manufacturing premises, domestic and international).

Inventory costs (packing, reverse logistics-warehousing and storage).

Administration costs (costs related to customs declaration, inspection of goods, transactions...).

### 3. Logistics costs in Vietnam

According to the study of MOIT (2019), Vietnam has not had official statistics of logistics costs as well as methods of calculating them, but the main components that make up logistics costs have been identified, which are transportation costs, inventory costs, and administration costs (MOIT, 2020). In the report published by Advance Logistics Group Consult-



**Figure 1. Logistics cost components in Vietnam in 2014**

*Source: MOIT (2020)*

**Table 2. Logistics costs by main exported products by Vietnam in 2014**

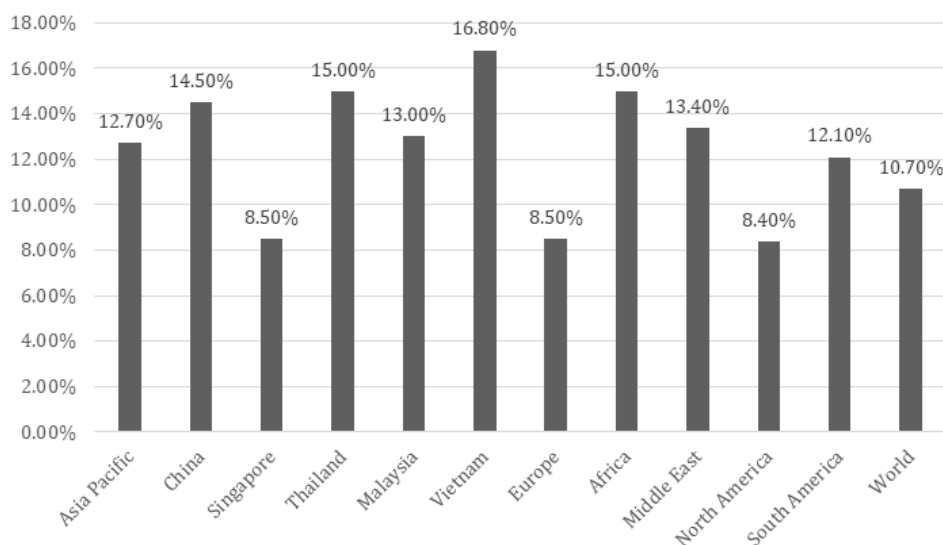
No.	Product	Logistics costs / GDP
1	Seafood	12.2%
2	Rice	29.8%
3	Coffee	9.5%
4	Vegetables, fruits	29.5%
5	Beverage	19.8%
6	Textile	9.3%
7	Footwear	11.7%
8	Pharmaceutical products	0.3%
9	Electrical products	1.2%
10	Electrical components, spare-parts	3.5%
11	Transportation vehicles	2%
12	Furniture	22.8%

*Source: MOIT (2020)*

ing (ALG Consulting) of World Bank, in 2014, transportation costs account for the largest proportion of Vietnam's logistics costs, with 59% (Figure 1). Likewise, in the study of MOIT, (2019), the structure of components in Vietnam's logistics cost in 2010 and 2016 is identical, in which the ratio of transportation costs is 60%, while the figures for inventory costs and administration costs are 36% and 4% respectively.

The method used in ALG's report is based on main exporting products of Vietnam and calculates the ratio of logistics cost/ GDP for each of these products. In partic-

ular, rice has the highest percentage with 29.8% while the lowest figure is associated with pharmaceutical products (Table 2). Following this method, the reported logistics costs in 2018 is 16.8% of GDP (Figure 2), equivalent to 42 billion USD. The ratio of logistics costs to GDP represents the level of development and the role of logistics in the economy. Compared to other countries such as China, this rate is 14.5%, the figures for developed countries such as the US and Singapore are about 7.5-8.5% (Figure 2). Three components of logistics costs shall be analyzed to figure out reasons why the logistics cost in Viet-



**Figure 2. Logistics costs in 2018**

*Source: MOIT(2020)*

nam is still high at 16.8%.

### **3.1. Transportation costs**

There are different modes of transport that can be used to deliver the goods from one place to another place, and the common ones are road transportation, rail transportation, air transportation, sea transportation, and inland waterway transportation. The majority of goods are delivered by road and waterway, around 90%, in which road transportation accounts for 77% (World Bank, 2019).

#### *a. Road transportation.*

In 2019, a research conducted by World Bank's experts including Yin Yin Lam, Kaushik Sriram, and Navdha Khera was introduced to assess road transportation in Vietnam and give solutions to reduce logistics costs by implementing surveys with 1,400 truck drivers and 150 logistics companies. Road transportation costs are estimated at 2,775 VND/ton/km for short-haul delivery and 952 VND/ton/km for long-haul delivery, and the profit margin is

about 3-5% for transportation companies with less than 10 vehicles. The top five cost-categories for delivery businesses are fuel costs, tolls, informal fees, interest expense, and wages (Yin et al., 2019). The ratios for main costs in road transportation costs are 30-35%, 10-15%, and 15% for fuel costs, tolls, and wages respectively (VOV Transport, 2019). This is in line with the study of Yin et al., 2019 which emphasizes the high tolls and informal fees in Vietnam's road transportation (Figure 3). Regarding interprovincial transportation services, a fierce competition among logistics companies exists, leading to a significantly fragmented market and low profit margins. This can be illustrated by the fact that the average number of vehicles in each logistics company is about 5 vehicles with their net margins are 3% for short-haul deliveries and 5% for long-haul deliveries (Figure 4), and 68% of trucks in Vietnam are those less than 5 tons (Yin et al., 2019). Another downside is a lack of transport exchanges or logistics centers to match supply with demand (around 50-70% of trucks return with no load) (Yin et



In Vietnamese dong (VND) per ton-km

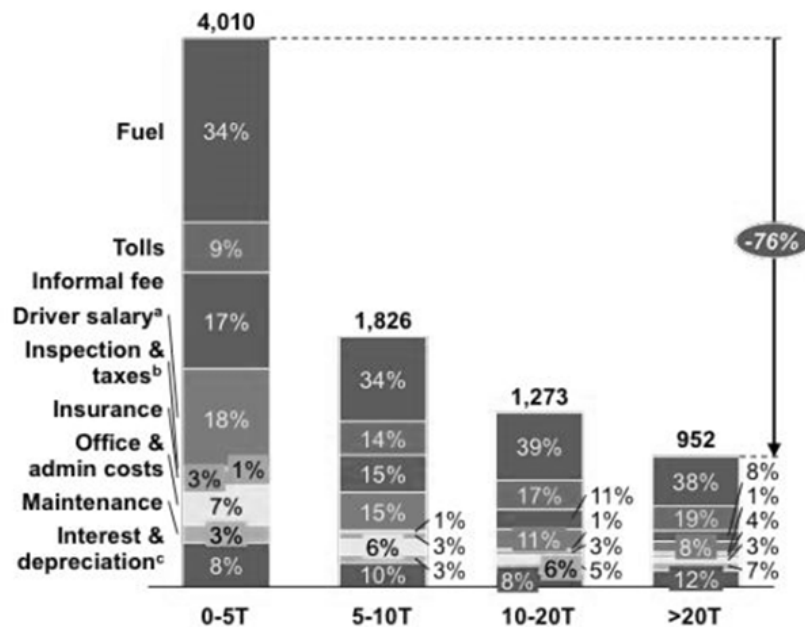
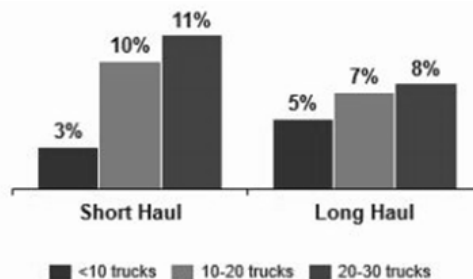


Figure 3. Components of transportation costs by Truck Size in Vietnam in 2019

Source: Yin et al., 2019



Note: Net margin = profit after tax + total revenue. Profit after tax = total revenue - (fixed costs + variable costs + interest + depreciation + opportunity cost + tax).

Figure 4. Net margins by Fleet size of Truck Operators in Vietnam in 2019

Source: Yin et al., 2019

al., 2019). Informal costs in road transportation are still high due to low load limit, unreasonable toll booths and the tight operating hours of trucks compared to increasing demand of logistics companies. This causes businesses to violate the regulations and pay informal fees. Regarding urban road transportation, a lack of clear separation between industrial and residential zones through land-use planning

in big cities as well as poor consolidation of goods through delivery hubs affect the productivity of logistics companies (Yin et al., 2019). Because they have to suffer severe traffic congestion, leading to inefficiency of transport routes within cities and from ports to the city.

#### b. Inland waterway.

While using inland waterway has lower

costs than road transportation, the door-to-door transportation services have much higher prices than trucking due to disconnected multimodal transport. According to the report of MOIT (2020), many transport routes in the Mekong Delta, handling costs account for up to 35% - 40% of total costs for full package transportation, and the delivery time is 5 times higher, and lower stability compared with road transportation due to the dependence on canals. This makes inland water transport unattractive for goods with quality requirements.

*c. Sea transportation.*

For domestic sea transportation on the North-South route, the freight from warehouse to warehouse is 40-50% of the road freight, but delivery time is 3-5 times higher, greatly affected by imbalance of seasonal goods and region's demand (MOIT, 2020). In terms of international freight which is currently quite high, unpredictable and unreasonable surcharges from carriers, lack of connectivity between seaports and transportation vehicles, and traffic jams are causes of the this problem. The year 2020 witnessed a crisis in the shipping industry caused by the Covid-19 outbreak and the shortage of containers, leading to sky-high ocean shipping rates. The rate for shipping a 40-foot container from Hai Phong port to an European Port increased from 1,000 USD to 8,000-9,000 USD at the end of 2020. To avoid these risks, majority of Vietnamese companies often import CIF and sell FOB, making the choice of carrier depending on foreign partners (Haiquanonline, 2021). While foreign partners choose carriers through bidding to cut costs. The carrier makes a small number of profit from this shipping to win the bid so there is always a way to increase local costs and surcharges (clean-

ing surcharges, overdue penalties, empty container balance surcharges). Consequently, this makes an increase in logistics costs, leading to non-competitive prices of products. Moreover, shipping lines also only choose to leave empty containers at big cities, near the port to speed up the rotation of containers. This leads to high costs of transportation for businesses located far from the empty container storage area and increases the pressure on traffic in port cities. For example, a rice company in the Mekong Delta has to bear at least 4 million VND more for taking empty containers for loading and then deliver them back to Ho Chi Minh City for export (Haiquanonline, 2021).

*d. Rail transportation.*

Currently, railway transport mainly carries passengers, due to the long travel time and high costs compared to sea transport, differences in broad-gauge and complicated transshipment procedures as well as costly handling fees. Moreover, upgrading fleets, buying new loading and unloading vehicles, and building railway tracks are extremely expensive.

*e. Air transportation.*

Although air transportation accounts for only a small part of the total volume of goods delivered by Vietnam's fleets, it accounts for 25% of the total export value (MOIT, 2020). Only Noi Bai and Tan Son Nhat international airport have the air cargo terminals and all the goods but by airlines from Vietnam are placed under the belly of passenger airplanes.

### **3.2. Inventory costs**

Vietnam only records the freight and warehouse index (including freight rates



for passengers and goods, warehouse service prices), and inbound and outbound costs of national reserve goods (MOIT, 2019). As can be seen in Table 3, the freight and warehouse index in Vietnam has increased slightly and steadily from 2015 to 2018.

Besides, Vietnam has not had a national logistics center yet, and has made a development plan of logistics centers in recent years. There are still some logistics hubs but small in terms of scale and scope of services. They mainly serve a number of businesses in the industrial sector or a province or city, which have not yet developed to the scale of serving a sector or an economic region. Most centers are not synchronous in investment scale, so they cannot provide sufficient functions of a logistics center, mainly doing the function of loading or unloading goods from containers, gathering empty containers to return to the shipping lines or deliver to domestic shippers (MOIT, 2020). Equipment for storage, loading and unloading is outdated, slowing down the warehousing process, causing damage to goods. The costs of cold logistics centers are still high due to costly electricity expenses. In specific, apart from Interserco's logistics center in My Dinh and Hateco in Long Bien, Hanoi does not have any significant space for logistics centers in the context that Hanoi has 9 industrial parks, 43 operating industrial clusters and 84 registered industrial clusters, 132 supermarkets, 454 markets and thousands of convenience stores to serve 7.78 million people in the capital (Tran Thanh Hai, 2019). The Prime Minister has issued Decision 1012/QĐ-TTg approving the Master plan to develop the logistics center system nationwide to 2020, with a vision to 2030. Accordingly, there will be 3 logistics centers Class I, 15

**Table 3. Freight and warehouse index in Vietnam**

Year Index	2015	2016	2017	2018
Compared with the previous year (= 100)	96.74	98.23	102.15	104.15
Compared with the year 2010 (= 100)	134.24	138.6	141.1	143.65

*Source: MOIT (2019)*

logistics centers Class II and 3 specialized logistics centers are identified as necessary for investment. While the understanding of this plan is still different among stakeholders, it is made on the orientation basis. Local governments should play an active role in making a more detailed plan and implementing it so they can attract investment from the central government. However, the understanding of this plan is still different among stakeholders, and some localities still hope to be the home of one of these logistics centers for investment from the State, while this is just an open plan on the orientation basis and the investment attraction must be conducted by the localities themselves.

### 3.3. Administration costs

In the total time from the registration of declarations to customs clearance/release, the time associated with custom offices only accounts for about 28%, the remaining 72% of time depends on the processing of specialized inspections by related procedures for import and export of goods (MOIT, 2019). These often encounter overloaded work due to a long list of imported and exported goods, in addition to ambiguous interpretation and guidelines in legal documents, leading to longer

**Table 4. Time and cost to import and export in 2019**

Series Name	Vietnam	East Asia & Pacific (excluding high income countries)	European Union
Time to export, border compliance (hours)	55.0	59.6	7.5
Time to export, documentary compliance (hours)	50.0	57.8	1.7
Time to import, border compliance (hours)	56.0	74.0	1.6
Time to import, documentary compliance (hours)	76.0	55.3	0.6
Cost to import, border compliance (US \$)	373.0	437.2	30.3
Cost to export, border compliance (US \$)	290.0	400.6	79.6
Cost to export, documentary compliance (US \$)	139.2	120.6	16.7
Cost to import, documentary compliance (US \$)	182.5	119.9	4.6

*Source: World Development Indicators, World Bank*

time of customs clearance and probably an increase in informal fees. While time to export related to border compliance of Vietnamese enterprises is shorter than those from East Asia & Pacific (excluding high income countries), it takes much more time for Vietnamese companies to comply with import documentary (76 hours of Vietnam and 55.3 hours of East Asia & Pacific) (Table 4). Furthermore, in comparison with East Asia & Pacific, Vietnam has significantly high cost to import and cost to export. When considering all of these indicators of developed countries such as European Union, the performance of Vietnam is far below in comparison with European countries' performances.

## **4. Conclusions and Recommendations**

### **4.1. Conclusions**

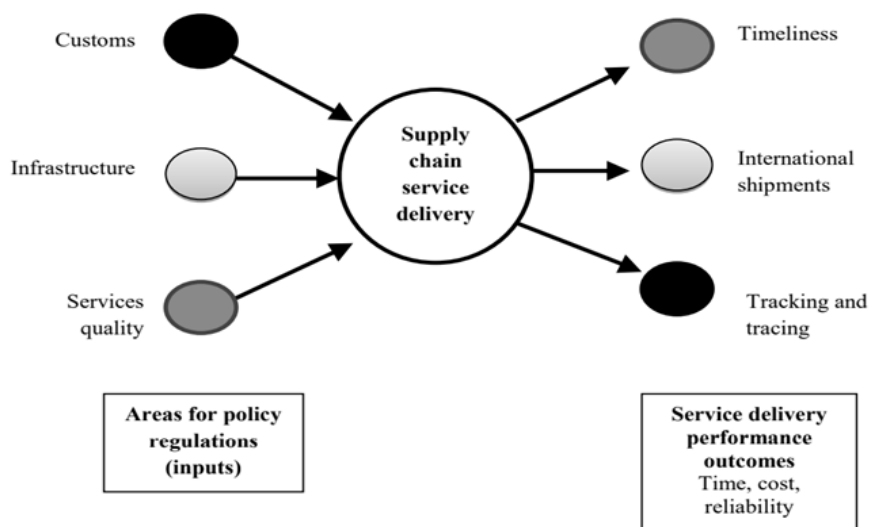
Logistics costs in Vietnam comprise of 3 main types of costs: Transportation costs, Inventory costs, and Administration costs. This study shows that logistics costs in Vietnam are still high compared with other countries in the region and in the

world. This is due to a number of following reasons: high toll and informal costs in road transportation, lack of connectivity in multimodal transport, international transportation depending on foreign enterprises, lack of logistics centers, and high cost to import and export.

From the above analysis, some recommendations are given below.

### **4.2. Recommendations**

*Firstly*, Vietnam's LPI needs to be improved, which can lead to a decrease in logistics costs. Based on the above analysis, logistics costs in Vietnam are still high due to the high costs of transportation, storage and administration. But that doesn't mean the lower the logistics costs, the better the logistics performance is. Logistics costs have a close relationship with the turnover of Vietnam's logistics businesses. Reducing logistics costs may lead to a decline in the revenue of Vietnamese businesses operating in this sector. Therefore, the issue of reducing logistics costs needs to be improved in the way of increasing the efficiency of logistics activities to optimize resources in society.



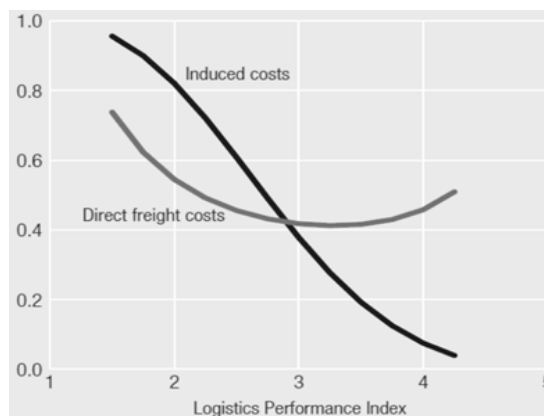
**Figure 5. Input and Outcome LPI Indicators**

*Source: WTO, 2012*

Currently, the performance of logistics operations is often assessed by the logistics performance index (LPI). This is an index given by the World Bank to rank the efficiency and capacity of logistics operations of countries. This index is published every two years. There have been 6 LPI ratings in 2007, 2010, 2012, 2014, 2016 and 2018. Although it is just an index given by an organization, the World Bank's LPI has been recognized by a large number of countries as a reliable indicator evaluating the performance of the logistics service industry in each country. The LPI indexes have six components (Figure 5):

- The efficiency of customs and border management clearance.
- The quality of trade and transport infrastructure.
- The ease of arranging competitively priced shipments.
- The competence and quality of logistics services.
- The ability to track and trace consignments.

The frequency with which shipments reach consignees within scheduled or ex-

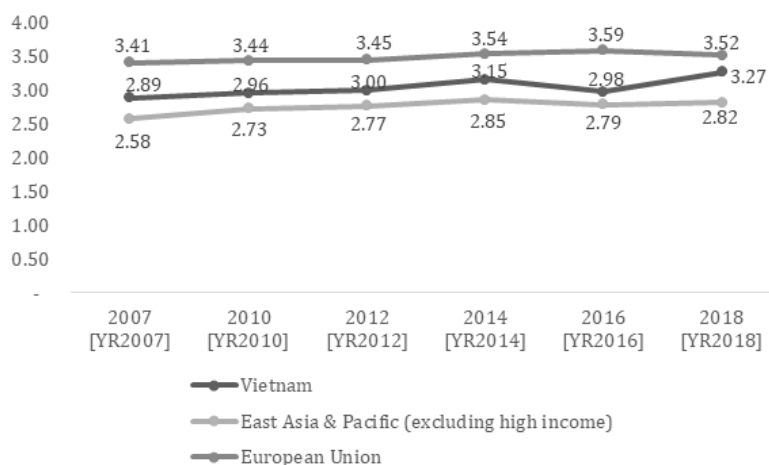


**Figure 6. The Relationship between the LPI and the Level of Logistics Costs**

*Source: Arvis, Mustra, Panzer, Ojala & Naula (2007)*

pected delivery times.

According to Karri Rantasila and Lauri Ojala (2012), there is a relationship between a country's LPI ranking and its level of logistics costs: countries with a low LPI score tend to have high costs. In particular, induced costs (related to non-delivery or the avoidance of non-delivery and storage) tend to be low in countries with a high LPI score, and direct costs (freight and other shipment-related costs) tend to decrease until the LPI score reaches a value of around 3.3 (Figure 6).



**Figure 7. Logistics performance index**

*Source: World Development Indicators, World Bank*

LPI of Vietnam has been improved through years, from 2.89 in 2007 rising to 3.27 in 2018. Especially, Vietnam's global ranking jumped from 64th in 2016 to 39th in 2018. Among the lower-middle-income economies, Vietnam led the global rankings in 2018 followed by India, Indonesia, Côte d'Ivoire, Philippines, and Ukraine (Koushan Das, 2018). However, in comparison with developed countries, Vietnam's logistics performance is far below (Figure 7).

Thus, in order to reduce logistics costs in the direction of improving logistics efficiency, it is necessary to pay attention to improve LPI. The improvement of LPI can be achieved by improving LPI components such as reforming customs procedures, improving the quality of infrastructure, utilizing advanced information technologies...

*Secondly*, Vietnamese companies should get the right to transport goods internationally by negotiating proper Incoterms. In the study of Pohlen, T. Klammer, T. Cokins, G. (2009), the application of international commercial terms (Incoterms) is closely related to logistics costs. One way of identifying the company's share of the

costs is to scrutinize the terms of delivery. For example, if a company purchases its raw material Ex-Works (EXW) and delivers its products duty paid (DDP), it may seem to incur higher logistics costs than a company that arranges its deliveries differently. But on the positive side, businesses will buy goods with the cheapest price and sell goods with the highest price. Vietnamese enterprises should choose the commercial terms in which they have the right to charter transportation vehicles. In international transactions, businesses should build strategic relationships with a number of shipping lines, and take the initiative in negotiating with partners on chartering rights. As a result, there is a basis to negotiate with a foreign partner to win the right to transport, thereby controlling shipping costs and avoiding pressure of high freight costs.

*The third recommendation* is that there is a strong need for Vietnam's logistics enterprises to coordinate and support each other to implement full logistics services in a supply chain to improve efficiency and reduce costs for logistics operations. Currently, Vietnam has more than 3,000 enterprises registered to operate in the

logistics sector, of which 89% are domestic enterprises, 10% are joint ventures, and 1% are foreign enterprises. Domestic enterprises are mostly small and only account for about 20% of the total market revenue (Cao Cam Linh, 2021). Domestic logistics companies only provide fragmented logistics services in the territory of Vietnam such as forwarding services, packaging services, warehouse rental, customs services... At the same time, there is a lack of synchronous linkage between logistics businesses participating in the whole supply chain. Meanwhile, integrated and international intermodal services are provided by foreign owned enterprises. Therefore, the Vietnamese government should have a strategic plan to coordinate logistics activities of Vietnamese companies in an integrated supply chain to improve performance of the logistics industry.

*Fourthly*, applying information technologies to logistics activities is an inevitable trend, advanced technologies in management and administration should be used in all stages of supply chains, including logistics activities. Logistics infrastructure systems include physical infrastructure such as transportation systems, wharf... and soft infrastructure such as human resources, system of policies and laws, procedures... These systems cannot be controlled and managed effectively and efficiently unless information technologies

are integrated and applied in the systems. The ability of container ships to load or unload cargo quickly or slowly depends heavily on the technology used by shipowners and port operators in their management. Technology can help shipowners plan the whole process, how to load and unload goods, moving goods to or from the yard, even how to load containers in an optimal way. Meanwhile, port authorities rely on technology to monitor the safety of the waters and process paperwork so that ships can get in and out of ports effectively and in a timely manner.

#### **4.3. Limitations and Future research**

In some parts of the paper, the data has not been up-to-dated. This is because the fact that data on logistics costs in Vietnam has not been official collected and there are no authoritative agencies responsible for doing this. Moreover, secondary data, e.g. World Bank's data on logistics costs, are publicized every 2 years, and the latest available data is investigated in 2018. There is an immediate and urgent need for research in the future on the method to calculate the logistics costs in Vietnam, and the results should be evaluated and audited before and after the time when the project is conducted. This should be an important and reliable source to inform governments and private sectors in the process of decision-making ■

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