Original article

Analysis on Vietnam's Logistics system based on the World Bank's Logistics Performance Index 2018☆

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Abstract

Vietnam is a developing country with impressive economic achievements in recent years. Efficient logistics system is considered the key to success of Vietnam's development, especially when its economy relies on import, export and foreign investment. Since 2007, Logistics Performance Index (LPI) issued by the World Bank has been used as a trustworthy signal for the condition of a country's logistics system. In 2018, Vietnam's LPI shows a spectacular improvement by increasing 25 ranks and stands at the 39th position in the global ranking. It is also the best position for a lower-middle income economy in the ranking. The paper aims to reveal the current situation of Vietnam's Logistics system behind this remarkable increase of the LPI ranking. Both the statistical and empirical analyses will be applied to answer the proposed Hypothesis and Sub-Questions for better understanding on Vietnam's LPI. It is concluded that despite of a sudden rise in the LPI results, Vietnam's logistics system has not shown a significant improvement. In order to maintain the LPI rank in the top 50 in the world, Vietnam needs to continue making efforts to develop synchronous logistics system to gradually solve current problems.

Keywords: Logistics Performance Index, Vietnam, Logistics system

1. Introduction

Vietnam is a developing country with impressive economic achievements in recent years. As one of the most open economies in the world, Vietnam actively seeks out international and regional cooperation opportunities. Vietnam is now a member of the International Trade Organization (WTO), the Association of Southeast Asian Nations (ASEAN) with 16 bilateral and multilateral trade agreements. Vietnam has also actively participated in free trade agreements (FTAs) such as Vietnam-EU FTA, the Regional Comprehensive Economic Partnership (RECEP) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). Despite facing challenges from the global economic environment, Vietnam's economy has shown its ability to recover rapidly in recent years. After 2015 with a GDP growth rate of 6.7%, this figure in 2016 was 6.2% with momentum from export-oriented production and an increase in domestic demand. Due to the stability of exports with a growth rate of 9% and the slowing-down rate of import growth, Vietnam continues to maintain the balance of the economy and the country is a bright spot to attract foreign direct investment (FDI) (The World Bank Group, 2017).

In such context of economic development, efficient logistics system is considered the key to success of Vietnam's development, especially when its economy relies on import, export and foreign investment. Analyses which evaluate the state of the national logistics system become important to guide policies and investment for state agencies as well as independent organizations. One indicator that reflects the development of the national logistics is Logistics Performance Index (LPI). Since 2007, Logistics Performance Index (LPI) issued by the World Bank has been used as a trustworthy signal for the condition of a country's logistics system. In 2018, Vietnam' LPI shows a spectacular improvement by increasing 25 ranks and stands at the 39th position in the global ranking. It is also the best position for a lower-middle income economy in the ranking (**Table 1**). The growth of Vietnam's LPI score and ranking in 2018 is also reflected by the increase in the scores of all 6 component indexes. In particular, compared with 2016 results, the component indexes which increased the most and the least are 0.61

points and 0.17 points respectively (**Table 2**). However, does it mean that Vietnam's logistics system has recorded a significant improvement? In this paper, more details of Vietnam's LPI will be analyzed in order to answer the question. To achieve that, this paper first summarizes the basics of LPI before proceeding with statistical analysis.

Table 1: Top performing lower-middle-income economies, 2018

Economy	2018		2016		2014		2012	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Vietnam	39	3.27	64	2.98	48	3.15	53	3.00
India	44	3.18	35	3.42	54	3.08	46	3.08
Indonesia	46	3.15	63	2.98	53	3.08	59	2.94
Cote d'Ivoire	50	3.08	95	2.60	79	2.76	83	2.73
Philippines	60	2.90	71	2.86	57	3.00	52	3.02
Ukraine	66	2.83	80	2.74	61	2.98	66	2.85
Egypt	67	2.82	49	3.18	62	2.97	57	2.98
Kenya	68	2.81	42	3.33	74	2.81	122	2.43
Lao DPR	82	2.70	152	2.07	131	2.39	109	2.50
Jordan	84	2.69	67	2.96	68	2.87	102	2.56

Source: World Bank (2012, 2014, 2016, 2018)

Table 2: Vietnam's LPI rankings over the years

Year	LPI score	Customs	Infrastructure	International transport	Logistics capacity	Tracking and retrieval	Time
2018	39	3.27	2.95	3.01	3.4	3.45	3.67
2016	64	2.98	2.75	2.7	2.88	2.84	3.5
2014	48	3.15	2.81	3.11	3.09	3.19	3.49
2012	53	3	2.65	2.68	2.68	3.16	3.64
2010	53	2.96	2.68	2.56	2.89	3.1	3.44
2007	53	2.89	2.89	2.5	2.8	2.9	3.22

Source: World Bank (2007, 2010, 2012, 2014, 2016, 2018)

The hypothesis which needs to be verified in this paper is: *Has Vietnam's logistics system developed significantly since 2016*? The 3 sub-questions which should be solved are:

Sub-question 1: How precise are Vietnam's LPI scores and rankings?

Sub-question 2: Is the increase of Vietnam's LPI from 2016 to 2018 statistically significant?

Sub-question 3: Is there practical development supporting the improvement of Vietnam's LPI in 2018?

2. Literature review on Logistics Performance Index

The LPI consists of 2 component indices called international LPI and domestic LPI since logistics is considered as a network of services supporting the

movement of goods, cross-border trade and domestic trade. The international LPI is evaluated based on 6 criteria, including: Quality of infrastructure related to trade and transportation, The degree of ease of arranging transportation of exported and imported goods at competitive prices, Competence and quality of logistics service providers, Ability to track and trace shipments, Schedule of shipments to reach their destination against a specified deadline, Efficiency of inspection agencies at the borders. These criteria are based on theoretical and empirical research and practical experience of logistics experts including major logistics companies in the world. LPI uses standard statistical techniques to synthesize all data of component indexes into a single index. This index is used to compare countries, territories and different income groups. For domestic LPI, the World Bank does not rank but provides statistical data for 4 criteria: Infrastructure, Service quality, Procedures and Time for border processing and Supply chain reliability. Since its first appearance in 2007, the LPI has firmly been an important position in countries' policy making step by step. LPI results have been widely used in policy reports, documents and publications of state and international organizations such as Commission (2014), Deloitte (2014), European OECD (2015), DHL (2016), International Transport Forum (2016), World Economic Forum (2018). This result provides a global benchmark for logistics industry as well as logistics service users. LPI results have also been widely used in academic research, scientific journals, textbooks and teaching and learning activities at universities. Al-Futaisi (2015) used LPI to plan the logistics strategy of Sultanate of Oman. Andrejic and Milorad (2016) also used LPI in research to measure the effectiveness of global logistics. In this study, LPI is used as an input for principal component analysis and data envelopment analysis (PCA-DEA). The use of LPI score and ranking results is also applied in academic studies analyzing the relationship between this indicator and the global and regional economy such as

Gogoneata (2008), Au and Chan (2010), Guner and Erman (2012), Edirisinghe (2013), Erkan (2014), Puertas (2014), Cemberci et al (2015), Civelek et al (2015), D'Aleo (2015), Nunes et al (2015), Coto-Milan (2016), Ekici et al (2016), D'Aleo and Bruno (2017a, 2017b), Gani (2017), Pupavac and Mimo (2017), Raimbekov et al (2017), Jaller et al (2018). These

studies have confirmed the importance and reliability of LPI. However, due to its nature as the results of a web-based survey, LPI must be used very cautiously with the following notes:

Firstly, the LPI score can tell more than the LPI rankings when compared among other countries because the score is more accurate and a better basis to compare changes over time. Especially, for countries that are in the middle of the rankings, LPI scores can only differ slightly while the rankings are quite far apart. For example, Egypt ranked 60 and Bangladesh ranked 100, 0.36 points apart. In this range, the average difference in scores between these countries is only about 0.0088 points. Therefore, the fluctuation in a country's ranking from one year to the next one could be much greater than the country's actual score improvement.

Secondly, as analyzed above, the data used to calculate LPI is collected through an extensive online survey by questionnaire for logistics experts on how easy or difficult it is when arranging the commercial and logistics activities they experience based on 6 aspects when dealing with 8 selected countries. Like other questionnaire surveys, LPI is likely to have errors in sampling, diverting opinions of survey participants or changing opinions of survey participants due to the impact of the previous LPI results. The number of assessments for each country gathered from the survey is also very different. Therefore, it is important to check a country's LPI confidence interval (CI) before making any deep judgment: the smaller the CI, the more reliable the result.

The upper and lower limits of a country's confidence intervals are calculated as follows:

$$LPI \pm \frac{t_{(0.1,N-1)}S}{\sqrt{N}} \qquad \text{(Eq.1)}$$

The fluctuations in a country's LPI between years are only statistically significant when the CI gives scores for two consecutive years with no overlap.

   Thirdly, the trade characteristics of the countries are assessed to highly influence LPI. The "goods" in the survey refer to the types of goods traded generally. Therefore, the responses give very little information related to special commodity groups such as pharmaceuticals, foodstuffs, and potentially dangerous goods. These are items that need special transport and storage modes. In addition, the survey

participants are freight forwarders considered pure shipping units. Trade in large quantities of raw materials and energy products (such as ore, grain, oil and gas) are not well covered in LPI. For such large volume transactions, direct industrial trade or other intermediaries are used.

Fourthly, the experience of international freight forwarders may not represent the logistics environment in poor countries because, for this group of countries, logistics activities rely heavily on traditional operators. There is a disparity between traditional and international operators in terms of their interaction with state regulators and the level of service they provide. In developed countries, international networks tend to provide services to large companies, which have significantly higher levels of time, cost, and other factors than those of traditional trading companies.

3. Analysis on Vietnam's Logistics Performance Index

As mentioned in Section 2, the analysis and evaluation of Vietnam's LPI results and answering two Sub-questions 1 and 2 will be based primarily on LPI scores rather than rankings. LPI scores for 2016 and 2018 including Vietnam's upper and lower bound values are shown in **Table 3**. Vietnam's LPI scores for 2018 compared to those below are shown in **Table 4**.

Table 3: Vietnam's LPI scores 2016 and 2018

Year	Average LPI score	Lower bound	Upper bound	Rank
2018	3.27	3.11	3.44	39
2016	2.98	2.76	3.20	64

Source: World Bank (2016, 2018)

Table 4: LPI scores 2018 of Vietnam and lower ranking economies

Country	Code	LPI score	lower bound	upper bound	rank
Vietnam	VNM	3.27	3.11	3.44	39
Iceland	ISL	3.23	2.80	3.65	40
Malaysia	MYS	3.22	3.00	3.44	41
Greece	GRC	3.20	3.04	3.37	42
Oman	OMN	3.20	2.93	3.47	43
India	IND	3.18	3.10	3.26	44
Cyprus	CYP	3.15	2.85	3.45	45
Indonesia	IDN	3.15	2.85	3.45	46
Turkey	TUR	3.15	3.05	3.24	47
Romania	ROM	3.12	3.01	3.23	48
Croatia	HRV	3.10	2.84	3.37	49
Côte d'Ivoire	CIV	3.08	2.86	3.30	50
Mexico	MEX	3.05	2.90	3.20	51

Source: World Bank (2016, 2018)

Sub-question 1: How precise are Vietnam's LPI scores and rankings? The value of LPI cannot be denied in reflecting the development of logistics systems of countries; however, the reliability of LPI scores of each country in particular is not the same. This confidence level is reflected in the confidence interval (CI). Countries with large trading volumes such as China, Germany, the United Kingdom and the United States tend to have CI at 0.05 points or lower, meaning that the bias will be within 1% more or less compared to their scores. In contrast, for some countries which have smaller trade volumes, CIs are close to 0.5 and the difference can be up to 15% higher than their scores. Based on **Table 3** data, Vietnam in 2018 has a CI value of 0.16, accounting for 5% of the average LPI score value. This is not as high as that of some underdeveloped economies but reflects a lower level of reliability than developed countries. At the same time, logistics activities in Vietnam are heavily dependent on traditional logistics activities as well as trade in agricultural products, raw materials still account for a high proportion. Therefore, the conclusion for Sub-question 1 is that the reliability of Vietnam's LPI score in 2018 is not really convincing and it needs further tests.

Sub-question 2: Is the increase of Vietnam's LPI from 2016 to 2018 statistically significant? **Table 3** shows that the value of upper bound in 2016 (3.20) is higher than the value of lower bound in 2018 (3.11). In other words, the confidence interval of LPI results for Vietnam in 2016 and 2018 has overlap. **Table 4** shows that if Vietnam replaced the average LPI value of 2018 with the lower bound value, Vietnam would drop to 48th, ranked below Romania and just above Croatia. According to the LPI reports from 2007 to 2018, Vietnam's ranking tended to increase and then decrease for the next time with an average position of 51. This also shows that the 39th position in 2018 is a breakthrough compared to the average position over the years. The conclusion to *Sub-question 2* therefore, indicates that Vietnam's improvement in LPI results is not statistically significant.

4. Analysis on Vietnam's practical logistics system

This section will analyse the Vietnam's practical logistics system in order to find conclusion for the *Sub-*

question 3. The Vietnam's practical logistics system with all of its development or drawbacks in the period from 2016-2018 will be reflected in various aspects as follow.

4.1 In terms of policy

The importance of an effective logistics system for the development of the economy has received the attention of the government as well as the state management agencies. On February 14, 2017, the Prime Minister issued Decision No. 200 / QD-TTg on approving the action plan to improve competitiveness and development of Logistics services in Vietnam until 2025. The decision sets a target by 2025, the proportion of logistics service industry in GDP will reach 8% -10%, service growth rate will reach 15% -20%, the proportion of outsourcing logistics services will reach 50% -60 %, logistics costs fall to 16% -20% of GDP, ranking by the world's logistics performance index (LPI) in the world at 50th or higher. On December 30, 2017, the Government also issued Decree No. 163/2017/ND-CP stipulating logistics service business with the main content of classifying logistics services and deciding logistics service business conditions, limiting liability for logistics service traders. The promulgation of these documents is a premise to attract investment and comprehensive development of Vietnam's Logistics system, but the effect of legal adjustments from the state is always lagging. Following Decision No. 200/QD-TTg, on March 26, 2019, the Ministry of Industry and Trade issued Decision No. 708 / QD-BCT on approving Vietnam's Logistics Performance Index (LPI) improvement plan. It is difficult to expect that Decision No. 708 / QD-BCT could have immediate effects, but before that, in 2018, Vietnam's LPI ranked 39 in the world, fulfilling the goals of Decision 200 and Decision 708 above.

4.2 In terms of infrastructure

In the period of 2016-2018, it is impossible not to recognize the developments of the commercial and transport infrastructure system in Vietnam. Regarding road infrastructure, a series of highways such as Hanoi - Hai Phong, Hai Phong - Ha Long, Hanoi - Lao Cai highways have been completed and put into use. A series of Inland Container Depot (ICD) and distribution centers were newly built after 2015 such as ICD Phuc Loc (Ninh Binh province), ICD Hai Linh (Phu Tho province), ICD New Port (Haiphong city), ICD Mong Cai (Quang Ninh), ICD New Port (Dong Nai), TBS Logistics Center and ITL Logistics Center (Binh Duong province)... etc and other inland logistics nodes are going to be completed in very near future. The seaport system, especially container terminals, has also recorded

developments such as the introduction of VIP Green Port, Nam Dinh Vu and Lach Huyen (HICT) container terminals in convenient locations, which has increased capacity for the whole system and allows vessels of up to 200,000 Deadweight to dock at the port. The Automated customs clearance system (VNACCS/VCIS) put into use in 2017 has increased the efficiency of customs operations, helping to reduce time and logistics costs for goods. However, on the other hand, the highway system is mainly developed in the North while congestion is still common in both regions. The transportation system is mainly dependent on road transport, while the contribution of other modes of transport such as inland waterway and railway accounts for less than 10% and 1% of goods, respectively. The ICD system lacks close links with stakeholders in logistics chains such as ports, shipping lines, forwarding companies and lacks a variety of services (Nguyen et al, 2019).

4.3 In terms of logistics services providers

The 2018 survey of Vietnam Logistics Association (VLA) shows that the size of Vietnam's logistics enterprises is very limited, up to 8.8% of surveyed enterprises has fewer than 10 people, 29.1% of surveyed enterprises has early 11 to 50 people and enterprises with more than 500 employees account for only 12.2% (VLA, 2018). In terms of revenue, the revenue group from over 10 billion VND to 100 billion VND accounts for 40.6%, this is the lowest revenue group in the survey, this shows that the revenue of logistics service providers is not high, due to many subjective and objective causes such as limited and undiversified services, low value-added services and low quality of services. Ranked second is the revenue group not exceeding 10 billion VND and the revenue from over 100 billion VND to 300 billion VND, accounting for 18.2% and 16.8% respectively. Enterprises with revenue from over 500 billion VND to 1,000 billion VND ranked third with 11.9% and the enterprises with revenue from over 300 billion VND to 500 billion VND and over 1,000 billion VND respectively weight below 10%. The application of modern technology in Vietnam logistics enterprises is also very limited, as less than 30% of businesses use electronic data interchange (EDI), less than 30% of enterprises use enterprise resource planning. (ERP), less than 10% of businesses apply radio frequency identification (RFID) technology and less than 1% of businesses apply block chain technology and artificial intelligence (AI) (MOIT, 2018) .

4.4 In terms of logistics human resources

Logistics human resources play an important part in improving the competitiveness of Vietnamese logistics businesses, but for many reasons this factor is limited by the size of quantity and quality of human resources, which does not meet the needs of

the market. Regarding the professional qualifications and skills of employees, the survey results show that over 45% of employees with professional qualifications and work experience are assessed at a good level, thus, the quality of human resources ensuring the professional skills and working experience of Vietnamese logistics enterprises are basically guaranteed but there are still many limitations in recruiting high quality logistics human resources. The survey's results on IT proficiency and foreign language skills are only rated well by about 29% of the employees and over 41% rated fairly, resulting in the ability of people to work in the international labor environment with a good rate of 29.5% and a good level of 33.6%. Soft skills for logistics services include a lot of skills such as bargaining, negotiating and signing logistics contracts, drafting documents, teamwork skills, problem solving skills, ... surveyed results for the proportion of very good and good ratings are quite similar at about 38% (VLA, 2018).

Thus, through analysis and evaluation of elements of policies, infrastructure, logistics service providers and logistics human resources, Vietnam's logistics system in the period of 2016 - 2018 has had some positive developments but the basic issues have not been satisfactorily resolved. The growth rate of Vietnam Logistics industry reached 14% from 2017 to 2018, the growth rate of e-commerce market reached 25% but the contribution of logistics industry to the gross domestic product (GDP) is still very low, only about 4-5% and logistics costs account for 20% of GDP compared to the rate of less than 10% in developed countries. Therefore, from the reality of Vietnam logistics system, we do not have enough solid grounds to confirm the development of Vietnam's logistics system according to *Sub-question 3*.

5. Implication and Conclusion

Vietnam is a developing economy with proud economic achievements in recent years. These achievements have contributed significantly to the foundation of the national logistics system. In the World Bank's Logistics Performance Index (LPI) report in 2018, Vietnam's LPI has increased by 25 levels, ranked 39th in the world. However, through analysis of LPI and actual situation of logistics in Vietnam, we have obtained the following conclusions: *Sub-question 1: How precise are Vietnam's LPI scores and rankings? Answer:* The confidence interval of LPI scores in Vietnam is not too large, but it reflects a much lower level of confidence compared to leading countries.

Sub-question 2: Is the increase of Vietnam's LPI from 2016 to 2018 statistically significant? Answer: there is an overlap between the confidence interval of Vietnam's LPI scores in 2016 and 2018, so

statistically, the development of Vietnam's logistics system is not significant.

Sub-question 3: Is there practical development supporting the improvement of Vietnam's LPI in 2018? Answer: Vietnam has made great progress in terms of logistics systems but there are still unresolved issues in the short term. Therefore, there is no clear evidence for the outstanding development of Vietnam Logistics system.

Thus, through answering 3 *Sub-questions*, the answer to Hypothesis given is that although it increased to 25 levels and ranked in the top 50 in the LPI rankings in 2018, Vietnam's logistics system has not grown significantly compared to 2016. The paper's results also show that the use of the World Bank Logistics Performance Index results, especially for developing countries like Vietnam, should be done with care. In order to maintain the LPI rank in the top 50 in the world, Vietnam needs to continue making efforts to develop synchronous logistics system to gradually solve current problems.

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