

Logistics Costs in Lao People's Democratic Republic¹

Introduction

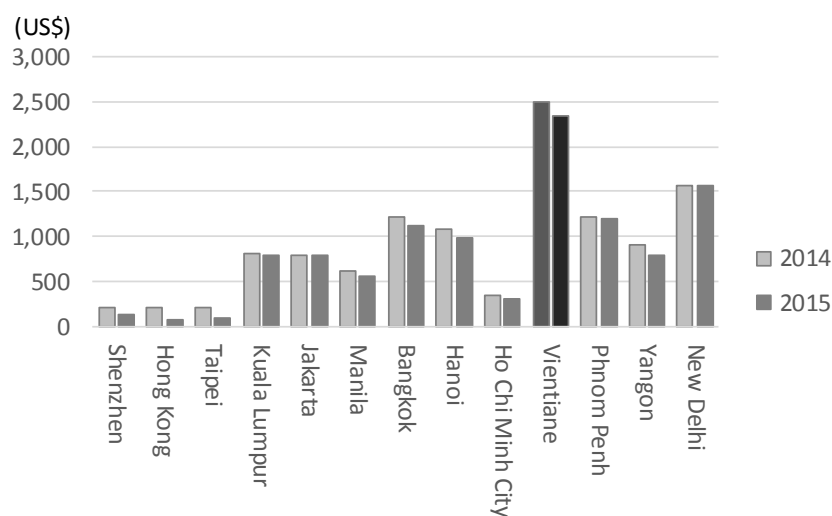
The Institute of Developing Economies, Japan External Trade Organization (IDE-JETRO), Japan External Trade Organization (JETRO) and the Lao People's Democratic Republic (PDR) Ministry of Planning and Investment held a policy-oriented seminar entitled “Enhancing Industry in Lao PDR: Service Liberalization, Simplification of Investment Procedures, and Human Resources” in 2015. The policy recommendation “Reducing the costs (time and money) and simplifying the procedures for transporting freights to and from neighboring countries” drew much attention at the seminar.

Figure 1 shows the cost of shipping a 40-ft container to Yokohama Port, Japan, from major production bases in Asia. The survey was conducted October through December in both 2014 and 2015. The cost for some cities, such as Shenzhen, Taipei, and Yangon, does not include land transport and some conditions are not same. The shipping costs of a 40-ft container from Vientiane are high.

The cost survey conducted in 2014 was broken down into land transportation costs from Vientiane to Bangkok (Klong Toey) Port (USD 1700) and the shipping cost from

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Figure 1: Cost of shipping a 40-ft container to Yokohama Port, Japan



Source : JETRO Censor , May 2015 and 2016.

Bangkok Port to Yokohama (USD 800). The land transport cost between Laem Chabang Port and Nong Khai, a border city in Thailand en route to Vientiane, was USD 700 as a reference. Considering that the difference in cost to Bangkok Port and to Laem Chabang Port is small, the logistics cost between Vientiane and Nong Khai is around USD 1000. This raises several questions. Is the transport cost over the 20 km between Vientiane and Nong Khai really so high, and what are the reasons? Is it because of the logistics costs on the Lao PDR side between Tha Na Laeng and Vientiane, because of the cross-border costs between the Lao PDR and Thailand, or because of the problem of “load on one side” (i.e., so-called “deadheading”)? This is where trucks from Laem Chabang Port or Bangkok Port to Vientiane must travel empty to transport goods from Vientiane to those ports.

To answer these questions, we conducted a research project in the fiscal year of 2016. In the survey, we interviewed several logistics firms based in Lao PDR, Thailand, and Japan. We traveled from Savannakhet to Laem Chabang Port and from Vientiane to

Klong Toey port and measured the times and distances. We show the survey results conducted in the fiscal year. The paper is composed of five sections. Section 1 describes the design of the survey and Section 2 shows the logistics situation between Lao PDR and Thailand. Section 3 addresses why the logistics costs between Thailand and Lao PDR are so high based on various costs for transportation. Section 4 discusses the domestic logistics costs in Lao PDR. Section 5 discusses the planned Vientiane Logistics Park (VLP), which will be supported by the Japanese government.

1. Survey Design

1.1 Survey of Firms

In this work, we clarify why the logistics cost between Lao PDR and Thailand is high. Thus, interviews with firms are crucial in this project and we interviewed Lao and Thai logistics firms in addition to Japanese logistics firms.

Table 1 shows the number of firms we interviewed for the project by location (Lao PDR, Thailand, and Japan) and the nationality of the firms/parent firms (Lao, Thai, and Japanese firms). We conducted three interviews in Lao PDR with representative offices of foreign freight forwarders that do not possess corporate status in Lao PDR and some firms in Lao PDR and Thailand that are affiliated firms owned by firms with other nationalities. The numbers of firms that are members of the Lao International Freight Forwarder Association (LIFFA) and the Thai Freight Forwarder Association (TIFFA) are shown. The numbers of member firms of LIFFA and TIFFA (including service providers for TIFFA) are shown at the bottom of the table. The number of firms registered in the list of freight forwarders and warehouse firms in the Economic Census

Table 1: Features of sample firms interviewed and logistics industries in Lao PDR and in Thailand

	Number of Samples	Lao PDR		Thailand	
		LIFFA	Census	TIFFA	Yellow Page
1-1 Lao Forwarder in Lao PDR	4	1			
1-2 Thai Forwarder in Lao PDR	1				
1-3 Japanese Forwarder in Lao PDR	3	1	1		
Sub-Total	8				
2-1 Thai Forwarder in Thailand	10			1	2
2-2 Japanese Forwarder in Thailand	1				
Sub-Total	11				
3 Japanese Forwarder in Japan	2	1		1	2
Sub-Total	2				
Total	21				
<hr/>					
Lao Forwarder	4				
Thai Forwarder	11				
Japanese Forwarder ¹⁾	5				
Total	20				
<hr/>					
	Population				
LIFFA	43				
Economic Census	170				
TIFFA Member & Service Provider	237				
Yellow Page of Thailand	1,291				

Note : 1) There is one Japanese forwarder in Lao PDR and in Japan owned by the same holding firm.

Source : Authors.

conducted in 10 provinces is shown in the “Census” column. The number of firms registered as logistics companies in Thailand on the website of the Thailand Yellow Pages is shown in the “Yellow Pages” column. For reference, the numbers of firms registered as freight forwarders and logistics firms in the Lao Economic Census and as Thai logistics firms in the Thailand Yellow Pages are shown at the bottom of the table. The number of firms that are LIFFA and TIFFA members and registered in the Economic Census in Lao PDR and in the Thailand Yellow Pages is limited.

In Lao PDR, no firms with Lao nationality conduct cross-border logistics operations between Lao PDR and Bangkok Port/Laem Chabang Port. This is because it is difficult for freight forwarders registered in Lao PDR to get licenses to enter bonded zones in Thailand while the rules should allow it, but nobody is permitted in reality and

foreign forwarders must fulfill many conditions². There are few firms in Thailand that provide cross-border logistics between Thailand and Lao PDR, whereas there are many freight forwarders in Thailand that provide domestic transportation and international transportation through ports and airports. One Thai firm that focuses only on cross-border logistics between Thailand and Lao PDR said that there are about 10 such firms in Thailand.

Thai freight forwarders and other foreign freight forwarders outsource to Lao freight forwarders for transport inside of Lao PDR. These Thai freight forwarders and other foreign freight forwarders may have representative offices in Lao PDR. Some foreign freight forwarders have opened affiliated firms in both Lao PDR and Thailand and provide cross-border transport between Thailand and Lao PDR, and domestic transport in Lao PDR and Thailand. Other freight forwarders outsource cross-border transport between Lao PDR and Thailand to Thai freight forwarders, and outsource domestic transport in Lao PDR to Lao freight forwarders. Outsourcing typically occurs among Lao, Thai, and other foreign freight forwarders.

Regarding business associations, we interviewed representatives of LIFFA and Thai Logistics for Greater Mekong Subregion Trade Association located at Khon Kaen. One of the Lao firms interviewed in Lao PDR is a member of LIFFA when we visited LIFFA and we interviewed three firms at the association in Khon Kaen.

We did not interview shipping firms for the project. Although we could communicate with a Japanese shipping firm, we did not because the difference in the roles of shipping firms and freight forwarders is clear: the responsibility is taken by

² Based on an interview with LIFFA on 1 November, 2016. According to the survey conducted by NIER (2016), 95.0% of transport and storage firms are occupied by small-sized firms with fewer than 10 laborers, the share of medium-sized firms with 10–99 laborers is 4.7%, and that of large-sized firms with more than 100 laborers is only 0.4%.

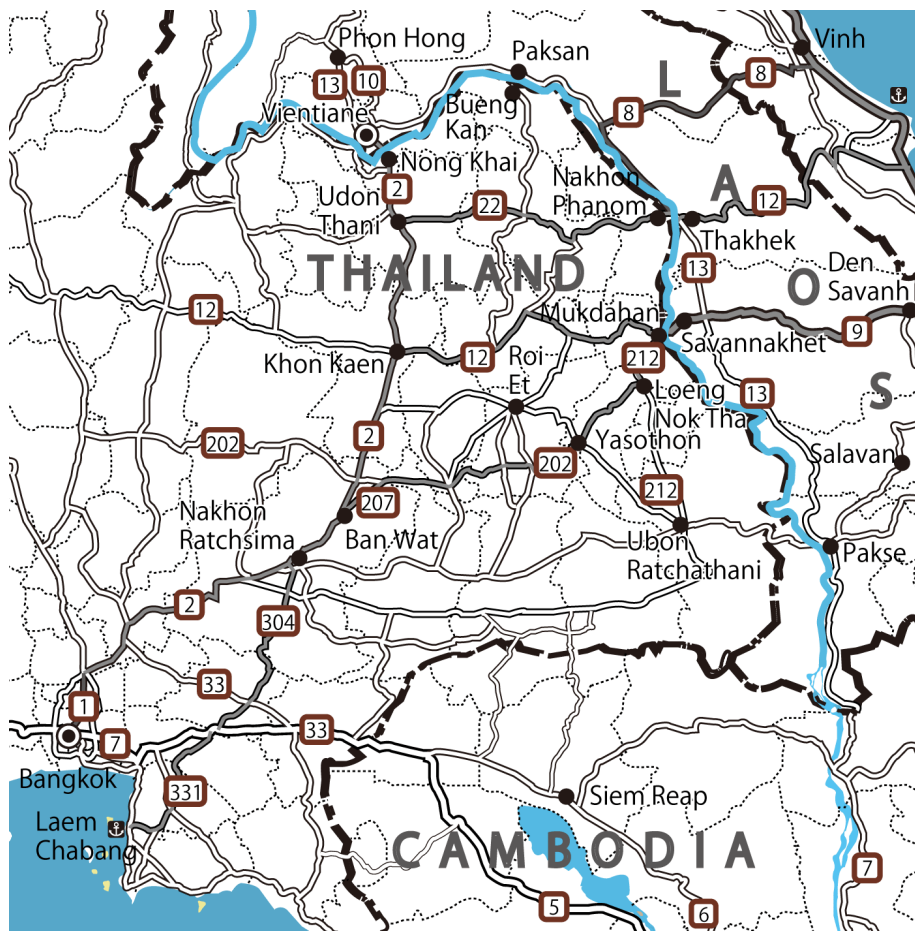
freight forwarders after the goods leave the container yard, except at dry ports.

1.2 Other Surveys

In addition to logistics firms, we interviewed a truck dealer in Thailand and a construction machine/truck dealer about the prices and characteristics of trucks. In the public sector, we interviewed government border officials. However, the governing regimes are different in Lao PDR and in Thailand. Lao PDR is a decentralized country, whereas Thailand is a centralized country. In Lao PDR, the staff at border gates handle different areas, including immigration, customs, animal quarantine, agriculture, forestry, food and drugs, health, bridge control, and tourism information. These sections are governed by related departments of provincial governments and regional departments of finance. Heads of the border crossings are appointed by provincial governors. Therefore, we made an appointment with the government officials at a border crossing office so that we could interview the staff from various sections in one session. In contrast, in Thailand, quarantine covers plants, wild animals, livestock, fishery products, health, and food and drugs, and each department is independent and controlled by the respective department of the central government. Some border crossings have no representative in charge. Therefore, we contacted each department to make appointments for interviews. Consequently, we interviewed border crossing officials from various sections of the First Mekong Friendship Bridge at Tha Na Laeng and from the Second Mekong Friendship Bridge on the Lao side, and interviewed customs officials of Mukdahan and Nong Khai and foodstuff quarantine officials at Nong Khai.

In addition, we interviewed representatives of Tha Na Laeng bonded warehouse and Lat Krabang Inland Container Depot as a relevant example for the VLP.

Figure 2: Logistics route between Lao PDR and Thailand



Source : Created by the authors.

2. Logistics between Lao PDR and Thailand

2.1 Routes between Thailand and Lao PDR

The routes focused on in the survey are: 1) Vientiane–Bangkok Port (640 km), 2) Vientiane–Laem Chabang Port (693 km), 3) Savannakhet³–Bangkok Port (663 km), 4) Savannakhet–Laem Chabang Port (716 km). These four routes share one node at the T-junction of Highway (HW) No. 2 and HW No. 304 near Nakhon Ratchasima (Figure 2). HW No. 2 connects to Bangkok, whereas HW No. 304 leads to Laem Chabang Port.

³ “Savannakhet” refers to “Khaision Phomvihane district and not to “Savannakhet Province.”

The details of the following four sections are shown in Appendix A: 1) Vientiane–Nakhon Ratchasima (387 km), 2) Savannakhet–Nakhon Ratchasima (410–451 km), 3) Nakhon Ratchasima–Bangkok Port (253 km), 4) Nakhon Ratchasima–Laem Chabang Port (306 km).⁴

2.2 Trucks and Trailers Used in Lao PDR and Thailand

In this sub-section, we describe the types of trucks used in Lao PDR and in Thailand, which are pickup trucks (1900–3000 cc), 6-wheel rigid vehicles, 10-wheel rigid vehicles, and articulated vehicles. An articulated vehicle is composed of a tractor with motor and a trailer without motor. A trailer in which the load is supported by the trailer itself with front and rear tires is called a full-trailer, whereas a trailer in which the load is not fully supported by the trailer is called a semi-trailer. A full-trailer is pulled by a rigid vehicle, whereas a semi-trailer is pulled by a tractor head (Figure 3). The word “trailer”, including full-trailers and semi-trailers, is used for articulated vehicles composed of a tractor or a tractor head and trailer or a semi-trailer. In Thailand, semi-trailers are frequently used, whereas full-trailers are used in Lao PDR.

In many cases, every axle other than the front axle has two wheels on the left and two on the right; the front axle has one on each side. As the number of tires increases, more cargo can be loaded, and less is loaded on each axle. In other words, the burden on the earth or on the road is better dispersed as the number of tires increases. However, articulated vehicles are prohibited from passing through residential areas and through the city during the day, and cannot use narrower roads. Thus, pickup trucks or 6-wheel

⁴ Our team made a trip from Mukdahan to Laem Chabang Port on 7 September, 2016 and from Vientiane to Bangkok Port on 2 November, 2016.

Figure 3: Wheel structures of various kinds of trucks, semi-trailers and full-trailers



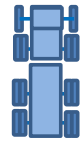
Pick-ups



6-wheel trucks



10-wheel trucks



14-wheel semi-trailers



18-wheel semi-trailers



22-wheel semi-trailers



26-wheel full-trailers



42-wheel full-trailers

Source : Created by the authors.

rigid vehicles are used for distribution in residential areas during the day, although these trucks carry less cargo than articulated vehicles.

Freight forwarders in Thailand mostly have trucks or tractor heads produced by Japanese-affiliated firms. The diesel oil price increased to THB 30 per liter with the increase in petroleum price in 2012, whereas the price of compressed natural gas (CNG) remained stable at THB 8.5 per liter, and CNG tractor heads produced by Chinese manufacturers temporarily sold well in Thailand. The boom in CNG tractor heads was temporary because the maintenance cost is higher and the traction is lower than for a diesel truck, and the number of CNG stations is smaller. In Lao PDR, some freight forwarders own second-hand trucks manufactured by Japanese-affiliated firms and others own new trucks manufactured by Chinese firms, whereas most freight forwarders, including local and foreign ones, use new trucks manufactured by Japanese-affiliated firms in Thailand.

2.3 Logistics in Lao PDR and in Thailand

The types of business of logistics firms in Lao PDR and Thailand are various. One Thai logistics firm delivers furniture or refrigerators bought by Lao people in a shopping center in a border area in Thailand to the buyers' houses on the Lao side by using a pickup truck. A Lao owner of 6- or 10-wheel trucks picks up consumer products such as canned fish, instant noodles, sugar, milk, desks, and chairs at Tha Na Laeng bonded warehouse unloaded by a trailer from Thailand and delivers to shops and gas stations in Lao PDR. Some Thai refrigerated trucks also deliver ice cream or pizza pie to shops in Lao PDR using a cold chain. A logistics firm in Lao PDR distributes beer to several cities in Lao PDR. Other than consumer products, construction machinery and

equipment are transported to dam construction sites in Lao PDR. They are imported to Lao PDR temporarily and are exported back to Thailand again. Some logistics firms in Thailand or Lao PDR transport fruit produced in Thailand to southern China.

Some Thai logistics firms export garments, coffee, furniture, and white charcoal (“binchotan”) from Lao PDR to the third countries via Laem Chabang or Bangkok Port. One Thai cement manufacturer export cements from Lao PDR to Thailand. However, the amount of cargo transported from Thailand to Lao PDR is 9 times greater than that transported from Lao PDR to Thailand.

3. Logistics Costs between Vientiane and Laem Chabang and Bangkok Port

In this section, first we report the logistics costs between Vientiane and Laem Chabang Port and between Vientiane and Bangkok Port based on the firm surveys. Second, we explain the problem of load on one side. Third, we show miscellaneous cross-border costs. Fourth, we discuss the logistics cost between Vientiane and Laem Chabang Port and between Vientiane and Bangkok Port and break down the logistics cost for the sections into the factors.

3.1 Logistics Cost Based on the Firm Survey

Table 2 shows the firm survey results for the logistics cost between Vientiane and Laem Chabang Port and between Vientiane and Bangkok Port. The logistics costs between Vientiane and Laem Chabang (693 km) are between USD 1333 and 2088; the average costs of Japanese and Thai firms are USD 1797 and 1567, respectively? The costs of

Table 2: Logistics costs between Vientiane and Laem Chabang and between Vientiane and Bangkok

	Minimum	Maximum	Japanese Average	Thai Average	Overall Average
Vientiane - Laem Chabang	THB 40,000 USD 1,333	THB 62,650 USD 2,088	THB 56,883 USD 1,797	THB 47,000 USD 1,567	THB 47,608 USD 1,537
Vientiane - Bangkok	THB 37,000 USD 1,233	THB 62,650 USD 2,088	THB 50,288 USD 1,610	THB 44,000 USD 1,467	THB 45,300 USD 1,457

Notes: 1) Exchange rate is assumed to be THB 30.0 per USD.

2) The costs between Vientiane and Laem Chabang are based on 3 Japanese firms and 2 Thai firms and those between Vientiane and Bangkok are based on 4 Japanese firms and 2 Thai firms.

Source: Created by the authors.

Japanese firms are 1.2-fold those of Thai firms, and the overall average cost is USD 1537.

However, the logistics cost between Vientiane and Bangkok Port (640 km) range between USD 1233 and 2088 and the average costs of Japanese firms and Thai firms are USD 1610 and 1467, respectively. The costs of the Japanese firms were 1.1 times greater than those of the Thai firms and the overall average was USD 1457. Therefore, the cost to Laem Chabang Port is 1.05 times that of the average or an additional USD 80 higher than to Bangkok Port. For transport from Savannakhet by trailer, the cost is about 1.1 times as much or an additional USD 100, and from Pakse it was 1.2 times as much, or an additional USD 133, compared with transport from Vientiane. The difference in transport cost between a 20-ft container and a 40-ft container depends on firms. Some firms say that the cost is similar because a 20-ft container is likely to be used for heavier goods, whereas a 40-ft container is used for bulky goods. One firm charges an additional USD 66.7 (THB 2000) to transport between Vientiane and Bangkok Port and USD 133.3 (THB 4000) to transport between Vientiane and Laem Chabang Port.

For Laem Chabang to Vientiane, the time for inspection at Laem Chabang Port

including an X-ray is at least 4 h, the time needed for transporting from Laem Chabang to Nong Khai is 14 h, and the border crossings at Nong Khai and Tha Na Laeng take 2 and 3 h, respectively. It can take more than 1 h because of traffic jams or regulations for trailers during the day, whereas it takes 0.5 h without them. Thus, it takes about 24 h including inspection at Laem Chabang Port.

3.2 Load on One Side

The problem of load on one side is often highlighted for transport between Bangkok and Hanoi and between Vientiane or Savannakhet and Laem Chabang Port. Specifically, on the way from Bangkok to Hanoi or from Laem Chabang Port to Vientiane, the container is fully used, and on the way back it is empty.

The problem differs, however, between Bangkok to Hanoi and Laem Chabang Port to Vientiane because of the ownership of containers. Between Bangkok and Hanoi, only on land transport is required, the freight forwarder can use their own containers, and the cost can be reduced if the freight forwarder finds goods to transport on their way back to Bangkok. In other words, this problem can be solved by addressing the trade imbalance between the destination and the origin, although this is not easy.

The journey between Vientiane and Laem Chabang Port for the freight forwarder is part of the transport between Vientiane and a third destination, such as Japan or Europe, including shipping. In this case, the container is owned by shipping firms. In accordance with the contract between a shipping firm and a freight forwarder, for instance, when a manufacturing firm in Vientiane exports products to a third country via Laem Chabang Port, the freight forwarder must transport an empty container to Vientiane. When the manufacturing firm imports parts and components from the third country via Laem

Chabang Port, the freight forwarder must also transport an empty container to Laem Chabang Port. If the forwarder loads goods on both sides, it may break the terms of the contract, even if the forwarder finds goods to transport for export and for import.

The cost caused by the load on one side is smaller for exporting from or importing to factories of the Eastern Seaboard of Thailand or Ayutthaya because the distance is less than 200 km. Transport with an empty container is much more expensive for transporting between Laem Chabang Port and Vientiane (693 km). As a solution, by building an inland container depot (ICD) or a dry port at Vientiane, the freight forwarder can rent an empty container from the ICD in Vientiane and transport goods to Laem Chabang Port or transport goods from Laem Chabang Port to Vientiane and return the empty container to the ICD in Vientiane. The VLP is planned and the details are discussed in Section 5.

We call the problem caused by using containers owned by shipping firms an institutional issue of load on one side. In addition to the institutional issue, the section between Vientiane and Laem Chabang also suffers from the trade imbalance between Lao PDR and Thailand, which is discussed in Section 5.1 in detail.

3.3 Miscellaneous Cross-border Costs

The cross-border costs charged at a border gate are composed of a bridge toll, a temporary import charge on vehicles into Lao PDR, and immigration fees for crossing a border.

Table 3 shows the bridge toll by type of vehicles at the First Lao–Thai Friendship Bridge (Tha Na Laeng) and Second Lao–Thai Friendship Bridge (Savannakhet). The bridge toll is controlled by the Ministry of Public Works and Transport of Lao PDR and

Table 3: Tolls of First and Second Mekong Friendship Bridges by Vehicle Type

	Tha Na Laeng			Savannakhet		2nd Bridge/ 1st Bridge
	LAK	USD		LAK	USD	
Trailers	81,000	10.1	Trucks with more than 10 wheels	135,000	16.9	1.7
7- to 10-wheel trucks	54,000	6.8	7- to 10-wheel trucks	94,000	11.8	1.7
6-wheel trucks	41,000	5.1	6-wheel trucks	67,000	8.4	1.6
Tour buses	27,000	3.4	Motor coaches	54,000	6.8	2.0
			Medium-sized coaches	40,000	5.0	
Mini coaches	13,000	1.6	Mini coaches	27,000	3.4	2.1
Pick-ups & Jeeps	8,000	1.0				
Sedans	5,000	0.6	Sedans with less than 7 seats	13,000	1.6	2.6

Notes : 1) The Exchange rate is assumed to be LAK 8,000 per USD 1.0.

2) The lengths of First and Second Mekong Friendship Bridges are 1,170m and 1,600m, respectively.

Source : Created by the authors.

the Ministry of Transport in Thailand and the payments are made before crossing the bridge. The bridge tolls are equivalent between the two countries and are adjusted by the exchange rate. The toll is 1.6–2.6 times as much at the Second Friendship Bridge as at the First Friendship Bridge, possibly because of the differences in the lengths and classifications between the bridges.

Table 4 shows the temporary import charge for vehicles into Lao PDR by type of vehicles at First Lao–Thai Friendship Bridge and Second Lao–Thai Friendship Bridge.

Table 4: Temporary import charges for vehicles into Lao PDR

	Tha Na Laeng			Savannakhet	
	LAK	USD		LAK	USD
Trucks with more than 17 wheels	165,000	20.6	Trucks with more than 17 wheels	165,000	20.6
Buses with more than 25 seats	150,000	18.8			
Buses and trucks with 10-12 wheels	80,000	10.0	Truck with 10-18 wheels	80,000	10.0
Buses with more than 6 seats and 6-wheel trucks	50,000	6.3	Passenger cars with more than 6 seats	50,000	6.3
Pick-ups and jeeps	25,000	3.1	Sedans	25,000	3.1
Sedans	9,000	1.1			

Note : Exchange rate is assumed to be LAK 8000 per USD.

Source : Created by the authors based on an interview at the Second Mekong Friendship Bridge Border Gate on 5 September, 2016 and a sign board at the First Mekong Friendship Bridge.

Table 5: Immigration Fees for Crossing the Border at the First Mekong Friendship Bridge

	Lao Nationals		Thai and Foreign Nationals	
	Passport	Border Pass	Passport	Border Pass
Weekdays 8:00-16:00	LAK 1,000 USD 0.13 THB 5 USD 0.17	LAK 11,000 USD 1.38 THB 50 USD 1.67	Free Free	Free Free
Weekdays Overtime 6:00- 8:00 16:00-22:00	LAK 10,000 USD 1.25 THB 45 USD 1.50	LAK 20,000 USD 2.50 THB 90 USD 3.00	LAK 11,000 USD 1.38 THB 50 USD 1.67	LAK 11,000 USD 1.38 THB 50 USD 1.67
Sat., Sun. and Holidays	LAK 10,000 USD 1.25 THB 45 USD 1.50	LAK 20,000 USD 2.50 THB 90 USD 3.00	LAK 11,000 USD 1.38 THB 50 USD 1.67	LAK 11,000 USD 1.38 THB 50 USD 1.67

Note : Exchange rates are assumed to be LAK 8000 and THB 30.0 per USD.

Source : Created by the authors based on a signboard at the First Mekong Friendship Bridge.

The classifications are different, but the charges are the same where the classifications are the same.

In Lao PDR, the immigration costs are different at different times and between nationals and foreign nationals (Table 5). Lao nationals have to pay immigration fees irrespective of time, whereas foreign nationals do not have to pay between 8:00 and 16:00 on weekdays. The immigration fees for Lao nationals increase and foreign nationals have to pay overtime fees outside the specified times on weekdays or on Saturdays, Sundays, and holidays. The fees can be paid in Lao kip and Thai baht, although the fee in Lao kip is cheaper based on the US dollar. Inhabitants of the border areas in Lao PDR and Thailand can cross borders with a border pass, although the immigration fees for Lao border pass holders are higher than for Lao passport holders, but they are similar for Thai border pass holders and passport holders.

These fees are a small proportion of the overall logistics costs. Other than these, costs include a customs clearance fee for Thai customs and Lao customs, a cross-border

Table 6: Miscellaneous Cross-border Costs for Trailers at the First Mekong Friendship Bridge

Official costs	(LAK or THB)	(USD)
Bridge tolls	LAK 162,000.0	USD 20.2
Temporary import charges for vehicles	LAK 165,000.0	USD 20.6
Immigration fees	THB 0 - 50	USD 0.0 - 1.7
Sub-total		USD 40.8 - 42.5
<hr/>		
Other costs	(THB)	(USD)
Customs clearance fees in Lao PDR	THB 6,000 - 6,500	USD 200 - 217
Customs Clearance Fees in Thailand	THB 4,000 - 4,500	USD 133 - 150
Empty container transport fees in Lao PDR	THB 1,500	USD 50
Empty container transport fees in Thailand	THB 500	USD 17
Documentation fees (optional)	THB 4,000 - 6,000	USD 133 - 200
Sub-total	THB 16,000 - 19,000	USD 400 - 633
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		(USD)
Total		USD 441 - 676

Note : Exchange rates are assumed to be LAK 8,000 and THB 30.0 per USD 1.0.

Source : Based on Table 3 - Table 4 and Interview with logistics firms.

transport fee for an empty container for Thai (for exporting from Lao PDR) or Lao customs (for importing to Lao PDR), and documentation costs. Table 6 shows the cross-border costs including these miscellaneous costs based on interviews from logistics firms. The documentation cost can be free if manufacturers can proceed by themselves. Miscellaneous fees, which are the dominant cost, are between USD 400 and 633. The overall cross-border costs are between USD 441 and 676.

3.4 Time Taken for Miscellaneous Cross-border Procedures

Next, we discuss the time taken for the cross-border procedure between Lao PDR and Thailand. The Nong Khai border gate is opened at 6:00. The trucks that transport goods from Laem Chabang or Bangkok arrive at the border at around 8:00–9:00. The

exporting procedure at the Nong Khai border, including a 30-min X-ray inspection, takes 30 min; usually trucks have to wait about for 1.5 h, so the overall time taken on the Thai side is 2 h. After crossing the Mekong River, perishable goods and duty-free goods are transported to Dongphosy Container Yard (Dongphosy CY) and other goods must undergo X-ray inspection at Tha Na Laeng bonded warehouse (see Section 5). It takes 3–4 h before the trucks complete the inspection around 13:00 or 14:00.

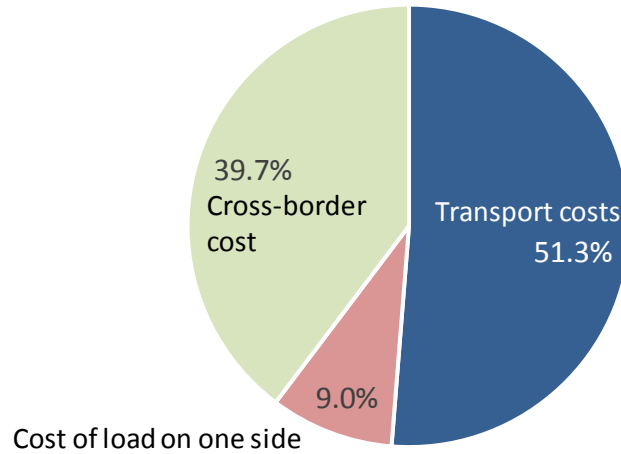
Trailers or semi-trailers with empty containers for exporting from Lao PDR to the third countries are usually procured at Laem Chabang Port or Bangkok Port two days before leaving Vientiane. The customs clearance procedure for the empty container is finished in the early afternoon and the trailer arrives at around 14:00. It takes 1 h to load goods at the factory, 1 h for processing at Tha Na Laeng and 0.5 – 1 h at Nong Khai if the cargo is transported to Tha Na Laeng before 18:00⁵.

3.5 Discussion of Logistics Costs between Lao PDR and Thailand

Logistics operations are conducted by Thai or foreign freight forwarders, not by Lao freight forwarders between Lao PDR and Laem Chabang Port and Bangkok Port. Thus, almost all the trailers for such transport are registered in Thailand. The transport cost of a trailer in Thailand per kilometer is USD 1.126 (Table 7). Multiplying this cost per kilometer by 640 km between Bangkok and Vientiane gives USD 721. However, this cost is based on loading on both sides. According to a Thai firm, the logistics cost can be decreased to 70% of the original cost of load on one side if load on both sides can be achieved, calculated by

⁵ The border gate is closed at 21:00 and customs can proceed until 20:00 (based on an interview with a logistics firm on 1 November 2016).

Figure 4: Breakdown of logistics costs between Bangkok and Vientiane



Source : Based on the Analysis by the authors.

$$x + 0.7x = 721 \times 2$$

Here, x is the cost of loading. The logistics cost of load on one side is USD 848 (x). The cost of loading on the way back is USD 594 ($0.7x$). Adding the median cross-border cost ($[\text{USD } 441 + \text{USD } 676]/2 = \text{USD } 558.5$) to USD 848 gives USD 1406.5. Finally, as shown in Figure 4, the logistics cost between Vientiane and Bangkok is broken down into 1) transport cost of (USD 721 [51.3%]), 2) cost of load on one side(USD 127 [9.0%]), and 3) cross-border cost(USD 558.5 [39.7%]).

In Table 2, the range of costs is covered by the range between the minimum and maximum values (USD 1233 and 2088), and the average value of USD 1524 is higher than the average cost of Thai freight forwarders (USD 1467). Next, using the minimum transport cost of a trailer in Thailand per kilometer (USD 0.74) and the maximum (USD 1.482), the transport costs for 640 km are USD 474 and 949, respectively, and the costs of load on one side are USD 557 and 1116, respectively. Adding the minimum

cross-border cost (USD 441) to USD 557 and the maximum cross-border cost (USD 676) to USD 1116, the accumulated minimum and maximum costs are USD 998 and 1792, respectively, between Vientiane and Bangkok Port. However, the logistics cost between Vientiane and Bangkok Port according to a 2014 JETRO survey was USD 1700, and this value is also less than the accumulated maximum value of USD 1792. The average cost of Japanese firms in Table 2 (USD 1610) is also less than the accumulated maximum cost (USD 1792), whereas the maximum cost of Japanese firms (USD 2088) is higher than that of Thai freight forwarders (USD 1792).

4. Domestic Logistics Costs in Lao PDR

4.1 Difference between Domestic Logistics Costs in Lao PDR with Thailand

This section discusses the domestic logistics costs in Lao PDR, apart from the cross-border logistics costs between Lao PDR and Thailand. First, we compare domestic logistics costs in Lao PDR and with those in Thailand. The logistics costs must be compared for similar conditions. For example, the logistics costs per kilometer are different for transport over shorter distances and for longer distances, and for mountainous and flat terrain. We compare the logistics costs for Vientiane–Savannakhet (490 km) and those for Bangkok–Khon Kaen (450 km). These two sections are both relatively flat, have similar distances, and connect major cities. One of the differences is that Vientiane–Savannakhet has two lanes, except for the section around Vientiane, whereas Bangkok–Khon Kaen has at least four lanes and it enables truck drivers to drive at higher speeds.

Table 7 shows minimum, maximum, and average costs with a full container load

Table 7: Difference in domestic logistics cost between Lao PDR and Thailand

	Minimum	Maximum	Average	Average per km	Scale factor
Vientiane - Savannakhet (Load on One Side)	USD 1,100	USD 1,250	USD 1,208	USD 2.466	2.2
Vientiane - Savannakhet (Load on Both Sides)	USD 735	USD 750	USD 743	USD 1.515	1.4
Bangkok - Khon Kaen	USD 333	USD 667	USD 507	USD 1.126	1.0

Notes: 1) Exchange rates are assumed to be LAK 8,000 and THB 30.0 per USD.

2) The costs between Bangkok and Khon Kaen are based on 5 Thai firms and those between Vientiane and Savannakhet are based on 1 Japanese firm, one Thai firm and one Lao firm.

3) The answers of the Lao firm are based on the cost per km per ton base. So the cost is calculated with an assumption a 25-t cargo in 20-ft full container.

Source: Created by the project team.

(FCL) based on interviews with firms in Lao PDR and in Thailand. Between Vientiane and Savannakhet, it takes 12 h and costs USD 1100 for load on one side and USD 743 for load on both sides, and the costs per kilometer are USD 2.466 and 1.515, respectively. However, between Bangkok and Khon Kaen, it takes 8–10 h, the cost is between USD 333 and 667, the average cost is USD 507, and the average cost per kilometer is USD 1.126. Thus, the average cost per kilometer in Lao PDR is 2.2 times as much with load on one side and 1.4 times as much with load on both sides relative to costs on the Thailand side.

Furthermore, for the mountainous section between Vientiane and Luang Phrabang, the cost is about 1.25 times that between Vientiane and Savannakhet. However, the cost between Vientiane and Tha Na Laeng with a 6-wheel rigid truck is USD 69, according to a Lao logistics firm, and the cost with a FCL trailer is USD 100, according to a Japanese freight forwarder.

4.2 Other Logistics Cost Factors

We discuss the price of trucks, drivers' wages, and fuel prices. The listed prices of a tractor head are THB 3.147–3.347 million (USD 104,900–111,567) for Japanese affiliated manufacturers and are similar to those for Chinese manufacturers (THB 3.15–3.25 million, or USD 105,000–108,333). The Chinese tractor heads are discounted to two-thirds of the listed price (USD 70,000–72,222), whereas Japanese tractor heads are only 10% off the listed price (USD 94,410–100,410). Thus, the real prices of Chinese tractor heads are 73% those of Japanese⁶.

In Lao PDR, the price of Chinese tractor heads for 30-t loads is USD 60,000, around half that for Japanese tractor heads (USD 120,000)⁷. Thus, the price of Chinese tractor heads in Lao PDR is just 83–86% of that in Thailand, whereas the price of Japanese tractor heads in Lao PDR is 1.19–1.25 times that in Thailand. However, Chinese tractor heads cannot be sold in the second-hand market after five years, whereas Japanese tractor head can be sold at around half their original price.

The wage of a trailer driver in Thailand is between THB 20,000 (USD 667) and THB 30,000 (USD 1000) and the average of four firms is THB 23,125 (USD 771). In Lao PDR, the wage of a trailer driver is between LAK 1,300,000 and 1,500,000 (USD 162.5 and USD 187.5) and the average of one firm is LAK 1,400,000 (USD 771). Thus, the wage of a trailer driver in Thailand is 4.4 times higher than that in Lao PDR.

We conducted a small fuel price survey checking the price at gas stations in Bangkok and in Vientiane on the same day (7 June, 2016). In Thailand, gasoline

⁶ The description in this paragraph is based on an interview with a Japanese-affiliated truck sales firm on 3 November 2016.

⁷ In Lao PDR, the import tariff for a truck is 30%, excise tax is 8%, and VAT is 10%, whereas tractor heads imported from China are free from these taxes due to the ASEAN–China Free Trade Area.

contains 10% or 20% ethanol, whereas gasoline contains no ethanol in Lao PDR, so

Table 8: Fuel price comparison between Lao PDR and Thailand (Survey on June 7, 2016)

Lao PDR				
	Price	Ex. rate	USD	Scale factor
Gasoline	LAK 6,050	8,060	USD 0.75	1.04-1.14
Diesel	LAK 7,370	8,060	USD 0.91	1.27

Thailand				
	Price	Ex. rate	USD	Scale factor
20% Ethanol regular	THB 23.09	35	USD 0.66	87.9%
10% Ethanol regular	THB 25.23	35	USD 0.72	96.0%
Diesel	THB 25.14	35	USD 0.72	78.6%

Note : The exchange rate is the rate on the day based on the Bangkok Bank website.

Source : Survey by Mr. Souknilanh Keola for Bangkok and by Kenichiro Yamada for Vientiane.

strict comparison is difficult. The gasoline price in Lao PDR is 1.04–1.14 times that in Thailand, and the diesel price is 1.27 times as much in Lao PDR as in Thailand. Therefore, the wages of trailer drivers are lower, whereas the fuel price is higher in Lao PDR.

5. VLP Development Project

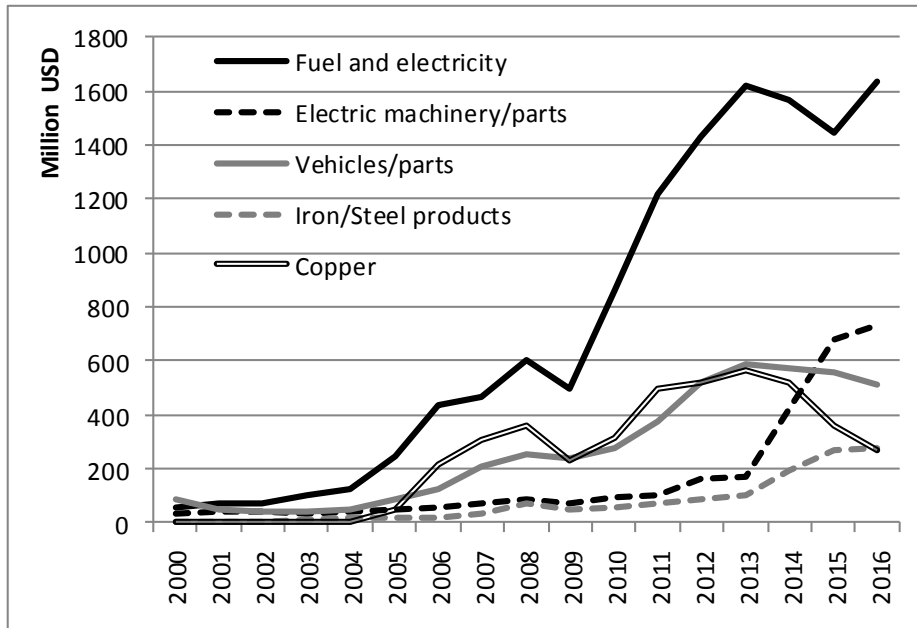
5.1. Trade Structure between Lao PDR and Thailand

Amid rapid growth of trade between Lao PDR and Thailand, the limited capacity of cargo-handling facilities in Vientiane has been a fundamental bottleneck that has hindered efficient, timely cargo transportation.

Based on Thailand Customs data, the amount of trade between Lao PDR and

Thailand has increased to USD 5.9 billion in 2016⁸, more than 12-fold the amount in 2000. Because this figure does not include Lao PDR's imports and exports from third

Figure 5 : Amount of Trade between Lao PDR and Thailand



Note : Data from Thailand Customs.

Source : JETRO from Global Trade Atlas

countries via Thailand ports, such as Laem Chabang Port and Bangkok Port, the actual total land transport volume between Lao PDR and Thailand is much larger. Although the rapid growth of fuel imports to Lao PDR has greatly affected the total trade amount, the electric machinery and parts trade has also sharply increased since 2013, indicating Lao PDR's participation in the regional supply chain (Figure 5). Thus, a fundamental issue with logistics around Vientiane is how to manage this increasing and diversifying cargo trade effectively.

Another bottleneck is the severe trade imbalance between Lao PDR and Thailand, especially at the Nong Khai-Tha Na Laeng border. According to JETRO (2015), in FY

⁸ This amount includes Thailand's exports to third countries via Lao PDR.

2013 (Oct 2012–Sept 2013), while Thailand exported THB 41.7 billion (approx. USD 1.4 billion) at this border, it imported THB 3.4 billion (approx. USD 0.1 billion). This trade imbalance causes the problem of load on one side, especially coupled with the institutional issue that arises from using ocean containers which restricts client companies to using containers under lease contracts (Section 3.2).

5.2. Existing Logistics Infrastructure in the Vientiane Area

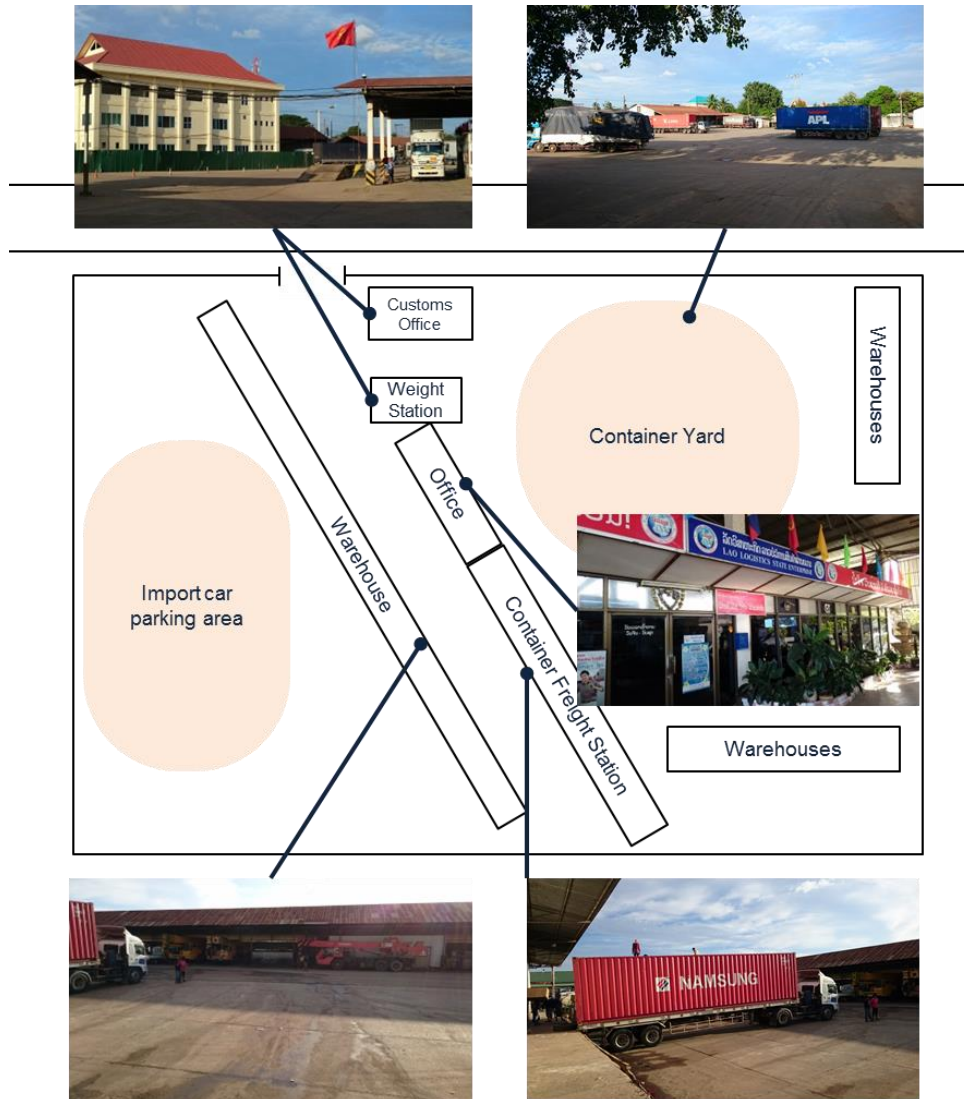
In the Vientiane area, imported goods are inspected in the Tha Na Laeng Bonded Warehouse. According to JICA (2015), the Tha Na Laeng Bonded Warehouse is located 500 m east of the First Friendship Bridge, and covers 6 ha land, of which 3.5 ha are for administration buildings, truck waiting areas, and warehouses, and 2.5 ha are used as parking spaces for trucks and imported vehicles (Figure 6). The warehouses are operated by Laos Logistics State Enterprise (LLSE), which the Ministry of Finance, Ministry of Industry and Commerce and the Ministry of Public Works and Transport (MPWT) jointly manage.

In our interview with LLSE on 1 November 2016, they stated that the average cargo handling volume is approximately 350 trucks on Tuesday through Thursday, whereas on Monday and Friday, the warehouse accommodates up to 500 trucks, because of the operation schedules of factories in the Vientiane area. Based on the figure in JICA (2015), in 2013, the number of incoming trucks to Tha Na Laeng Bonded Warehouse was reported as 37,420. Assuming 240 working days in a year, we estimated that in 2013, around 160 trucks per day used the warehouse, which implies a cargo volume surge in these two years.

Apart from Tha Na Laeng Bonded Warehouse, there is one container yard in the

Dongphosy area (Dongphosy CY), which was developed through funding provided by the Neighbouring Countries Economic Development Cooperation Agency (NEDA) of

Figure 6 : Tha Na Laeng Warehouse Location



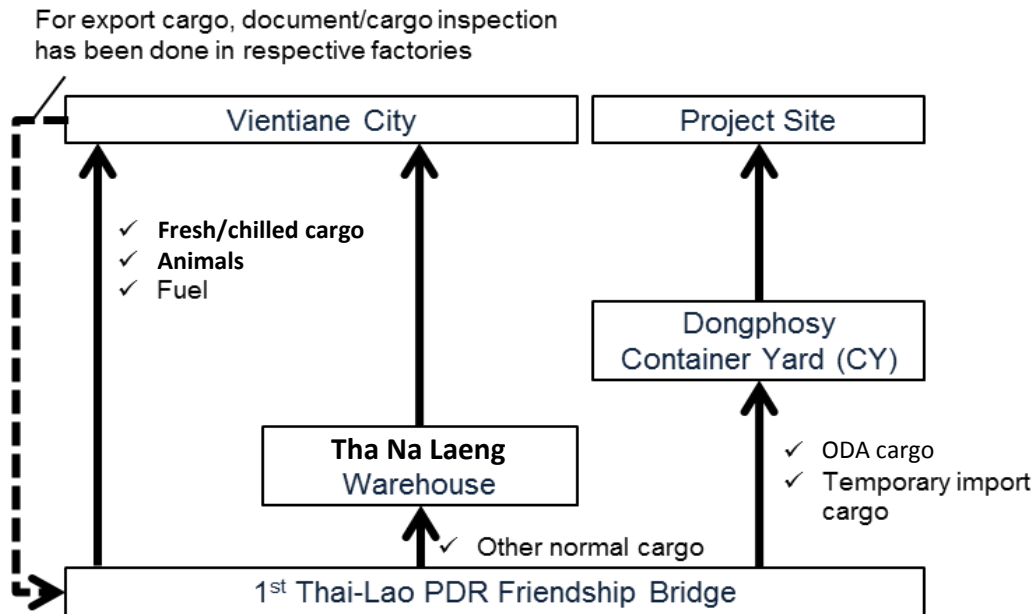
Source: JICA (2015) and pictures taken by the author on 2 November 2016.

Thailand, and its construction was completed in September 2015⁹. In July 2016, LLSE was also designated as an official operating body. Based on an interview with a Japanese logistics firm, since September 2016, both Tha Na Laeng Bonded Warehouse

⁹ Based on the NEDA website.

and Dongphosy CY have been used for imported goods inspections.

Figure 7 : Import procedure in the Vientiane area (current)



Source: Interview survey from LLSE (1st of November 2016).

5.3 Current Logistical Bottlenecks in the Vientiane area

5.3.1 Short-term Constraints

Current constraints on Tha Na Laeng Bonded Warehouse are i) limited cargo handling capacity, and ii) inability to manage emerging logistics needs (e.g., cold chain facilities).

To address point i), because of the cargo volume increase, since 2016, Official Development Assistance (ODA) cargo and temporarily imported goods, such as construction machinery, have been inspected at Dongphosy CY instead of Tha Na Laeng Bonded Warehouse. In addition, because of point ii), fresh and frozen goods, animals, and fuels are transferred directly to Vientiane. Therefore, currently there are three routes for importing goods from the First Friendship Bridge: direct to Vientiane, to

Tha Na Laeng Bonded Warehouse, and to Dongphosy CY. This makes customs tax collection and cargo tracking complicated and difficult (Figure 7).

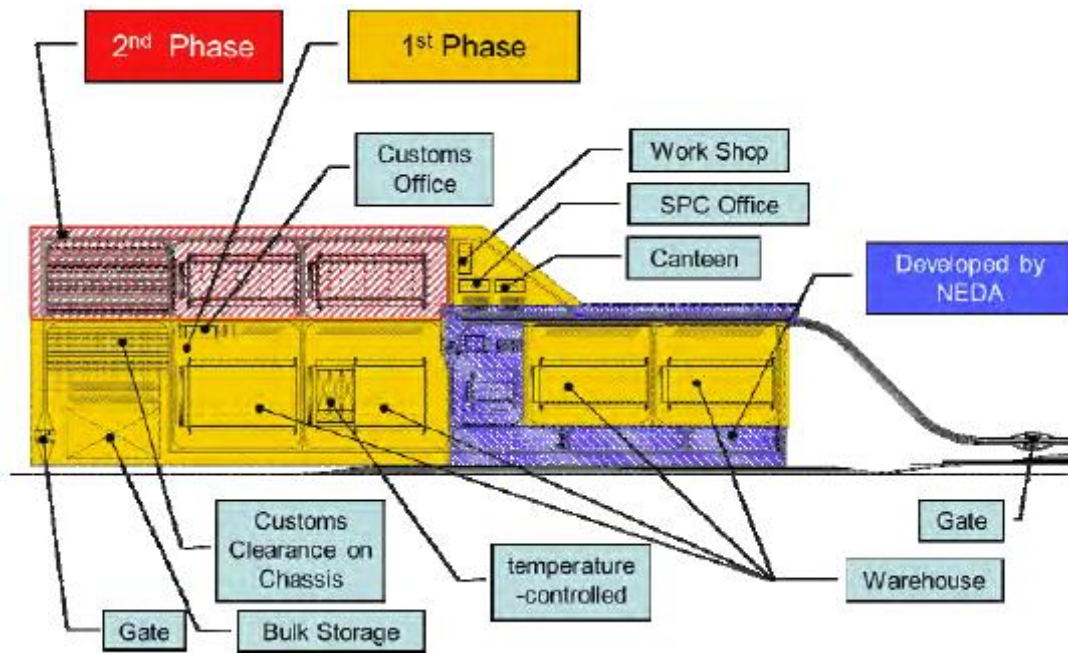
5.3.2 Necessary Future Steps

As discussed in Section 5.1, another major logistical bottleneck is the big trade imbalance at the Nong Khai–Tha Na Laeng border. Together with the long distance from Laem Chabang Port to Vientiane, this is one of the main reasons for the expensive logistics cost.

5.4 VLP development plan

To tackle the bottlenecks, MPWT and JICA conducted the “Preparatory Survey on Vientiane Logistics Park (VLP) Project in Lao PDR” in July 2015 and drafted a detailed VLP development plan. In its survey, it was recommended that VLP should be located in the Dongphosy area, with the advantage of using existing Dongphosy CY facilities

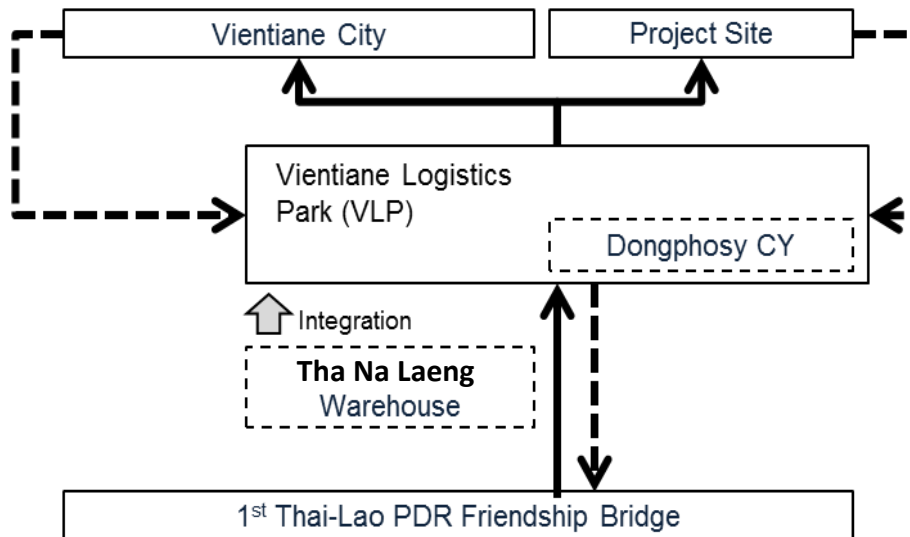
Figure 8 : VLP Layout



Note : SPC is an abbreviation of "Special-Purpose Company."

Source : JICA (2015).

Figure 9 : Import procedure at Vientiane area (VLP)



Source : Interview survey from LLSE (1st of November 2016).

and the potential of creating connections with railway systems. The design of the

facility is shown in Figure 8, while such grand design has been modified in line with the business profitability. VLP's services are categorized as follows: 1) existing service expansion (e.g., providing land area for on-chassis customs clearance, public bonded warehouses, and imported automobile inventory), 2) new services (e.g., low-temperature cold storage and tenant services), and 3) future services (e.g., railway cargo, ICD, and export consolidation).

Services 1) and 2) are expected to improve short-term logistical bottlenecks through streamlining the logistics and customs procedures, as well as adding new cold chain facilities (Figure 9). Service 3) will alleviate the load on one side problem by combining ICDs with railway cargo transportation systems and providing an export consolidation facility.

According to LLSE, 70% of the total finance will be provided by Japan, and Lao PDR will pay 30%, which includes the Dongphosy CY development cost. However, the schedule for opening VLP has been delayed from the original schedule (middle of 2017).

5.5 Business Potential of VLP

5.5.1 ICD and Consolidating Export Cargo Formation

The amount of trade in electric machinery and parts between Lao PDR and Thailand has increased sharply (Figure 1), indicating Lao PDR's initial participation in the regional supply chain. However, due to the trade volume imbalance between Lao PDR and Thailand and the small factory size in Lao PDR for these manufacturers, it has been difficult to use empty containers for export effectively, which inevitably increases the export logistics cost. Attracting further direct foreign investment through highlighting

Lao PDR's advantages, such as low labor and electricity costs, should allow facilities suitable for consolidating cargo formation to be developed.

However, to realize cargo consolidation, it is vital for the shipping firms that own ocean containers to cooperate. Currently, they want to keep the containers in Lao PDR for only a short time to minimize their risk, and impose expensive container lease deposits with short lease contract periods. This is particularly important if VLP has an ICD, where container operation risk between VLP and connected sea ports (e.g., Laem Chabang Seaport) is borne by shipping firms. Close discussion among stakeholders should be encouraged.

5.5.2 Cold Chain

Another business opportunity is cold chain facility development. JETRO (2015) illustrated the increasing demand for cold chain logistics from the food and medical industries. JICA's (2015) future demand projection predicts surging demand in low-temperature cargo, from 3980 t in 2018 to 22,577 t in 2042. Together with the recent boom in cross-border e-commerce from Thailand, a cold chain facility in VLP will be basic infrastructure required to improve quality of life.

Concluding Remarks and Policy Recommendations

In this short paper, we discussed the logistics costs between Vientiane and Laem Chabang Port and Bangkok ports, the domestic logistics costs in Lao PDR, and the plan for the VLP. The higher logistics costs between Vientiane and two Thai ports result from cross-border costs and costs caused by load on one side. The cross-border costs are the

largest part of the overall cost (39.7%), and the Government of Lao PDR should try to reduce the customs clearance fee and empty container fee to at least that of the Thai side. Further efforts to reduce the cross-border costs in cooperation with the Thai side are needed.

The costs caused by the load on one side problem are also large (9.0% of the overall cost). The problem of load on one side consists of two sub-problems: the institutional issue and the trade imbalance between Lao PDR and Thailand. The cost caused by the institutional issue can be solved by the development of railway to Tha Na Laeng and cargo consolidation by developing VLP as an ICD. In doing so, we must alleviate the additional burden for shipping firms in the operation of VLP, especially in terms of the extended risk transfer points, by adding own-risk between VLP, which is usually owned by factories, and the two ports that are currently own-risk (e.g., two ports to destination port). Thus, the cooperation of shipping firms is vital, so it is best to get shipping firms to support this project before development. It is risky for one shipping firm to support the project alone, so forming an alliance is one way to reduce the risk.

Making efforts to resolve the trade imbalance between Lao PDR and Thailand is also needed. For the resolution, Lao PDR has to increase exports by attracting foreign direct investment (FDI). Being located in the East Asia, where the production network of manufacturing products has been highly developed is fortunate for Lao PDR. If Lao PDR could reduce the logistics cost and could make easier to procure labor forces (IDE-JETRO 2016), attracting FDI should become easier. In this meaning, giving subsidies to foreign firms which increase the exports and contribute to resolve the trade imbalance for a specific period might be a good incentive policy for Lao PDR. As a matter of fact, it is heard that provincial governments in China sometimes give such

kinds of subsidies to foreign firms for two years.

The development of the railway can also reduce the transport cost between Vientiane and the two ports in Thailand. It might be necessary to build another bridge solely for the railway. The development policy cannot be decided by Lao PDR alone and needs the cooperation of Thailand and other donors. Trilateral communication among the government of Lao PDR, JICA, and NEDA is required.

Domestic logistics in Lao PDR cost 1.4 times as much for load on both sides and 2.2 times as much for load on one side than domestic logistics in Thailand. We examined the wages of drivers, the price of tractor heads, and fuel price, but we could not identify the major reason for the higher logistics cost in Lao PDR. Clarifying this reason is a future challenge.

Finally, the logistics cost from Vientiane to Yokohama Port is much higher than the cost from other cities (Figure 1). We hope that the government of Lao PDR notes the difference and that it is caused by cross-border costs and load on one side. By decreasing these costs, potential investors are expected to invest in Lao PDR and the lives of people in Vientiane will be improved by the decrease in the consumer price of goods, including goods imported through Thailand. Lao PDR is expected to be the regional logistics service hub in the region, as outlined in the Infrastructure Master Plan, by providing cheaper logistics to firms in the ASEAN region.

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Appendix A: Details of Major Routes between Lao PDR and Thailand

(1) Vientiane–Nakhon Ratchasima (387 km)

The roads between Vientiane and Nakhon Ratchasima are simple. Thadeua Road runs from Vientiane to Tha Na Laeng Border. After crossing the Mekong River, HW No. 2 in Thailand goes to Nakhon Ratchasima. There are no alternative roads for this section because there are at least four lanes along HW No. 2 so traffic can travel faster.

Vientiane – (Thadeua Road: 18km) – Tha Na Laeng Border – (Friendship Bridge: 2km) – Nong Khai – (HW. No. 2: 54km) – Udon Thani – (HW. No. 2: 118km) – Khon Kaen – (HW. No. 2: 180km) – Entrance to Nakhon Ratchasima – (HW. No. 2: 15km) – T Junction with HW. No. 304

(2) Savannakhet–Nakhon Ratchasima

From the office of the Savan–Seno Special Economic Zone Authority, it is about 1 km to the Savannakhet Border. There are several routes between Mukdahan and Nakhon Ratchasima. The shortest route is

Route A (410km)

SEZA – (HW. No. 13: 1km) Savannakhet Border – (2nd Friendship Bridge: 2km) – Mukdahan Border – (HW. No. 212: 52km) – Loeng Nok Tha – (HW. No. 2169: 64km) – Yasothon (HW. No. 202: 151km) – Mai Chaiyaphot – (HW. No. 207: 31km) – Prathai – (HW. No. 207: 38km) – Ban Wat – (HW. No.2: 51km) – Entrance to Nakhon Ratchasima – (HW. No. 2: 15km) – T Junction with HW. No. 304

Another shortcut using the East–West Economic Corridor (EWEC, HW No. 12) is

Route B (421km)¹⁰

SEZA – (HW. No. 13: 1km) Savannakhet Border – (2nd Friendship Bridge: 2km) – Mukdahan Border – (HW. No. 12: 92km) – Kuchinarai – (HW. No. 2046: 28km) – Phon Thong – (HW. No. 2044: 46km) – Roi Et (HW. 2045 and HW. 2040: No. 83km) – Phayakkhaphum (HW. No. 202: 34km) – Mai Chaiyaphot – (HW No. 207: 31km) – Prathai – (HW. No. 207: 38km) – Ban Wat – (HW. No.2: 51km) – Entrance to Nakhon Ratchasima – (HW No. 2: 15km) – T Junction with HW. No. 304

The simplest route using the EWEC is

Route C (451km)

SEZA – (HW. No. 13: 1km) Savannakhet Border – (2nd Friendship Bridge: 2km) – Mukdahan Border – (HW. No. 12: 92) – Kuchinarai (HW. No. 12: 40km) – Somdet (HW. No. 12: 42km) – Kalasin (HW. No. 12: 82km) – Khon Kaen – (HW. No. 2: 180km) – Entrance to Nakhon Ratchasima – (HW. No. 2: 15km) – T Junction with HW. No. 304

Route C is the simplest, and one logistics operator says that they use Route C because there are fewer narrow and curved sections, so it is suitable for trailers or semi-trailers.

(3) Nakhon Ratchasima–Bangkok Port (253 km)

Between Nakhon Ratchasima and Bangkok Port, the major route is shown below. However, there are various destinations in Bangkok. The section between Nakhon Ratchasima and Sara Buri is mountainous. After passing Sara Buri, many industrial estates and parks are in Ayutthaya and Patum Thani Province.

T Junction at Nakhon Ratchasima – (HW. No. 2: 144km) – Sara Buri – (HW. No. 1:

¹⁰ Regarding Route B, the distances are based on a trip from Kuchinarai to Mukdahan dated on 29 August, 2010 and a trip from Kuchinarai to Bangkok conducted on 11 January, 2011.

34km) – Entrance to Ayutthaya – (HW. No. 1: 20km) – Bang Pa-In (Expressway: 55km) Bangkok Port

(4) Nakhon Ratchasima–Laem Chabang Port (306 km)

There are no alternative routes between Nakhon Ratchasima and Laem Chabang Port. The route is via HW No. 304 and 331, while the route is experienced as continuous when the driver makes a trip (as well as the route between HW No. 202 and HW No. 207), HW 331 is separated at a T-junction into a road to Laem Chabang and a road to Sattahip. On the route to Laem Chabang, the section between Nakhon Ratchasima and Kabin Buri is mountainous. The road crosses the Southern Economic Corridor (HW No. 33) at Kabin Buri and HW No. 354, which runs to the Aranya Prathet–Poipet Border and Phnom Penh.

T Junction at Nakhon Ratchasima – (HW. No. 304: 137km) – Kabin Buri – (HW. No. 304: 46km) – Plaeng Yao (HW. No. 331: 81km) – T Junction – (HW. No. 331: 42km) – Laem Chabang Port