Chapter 5

Inter-State and Transit Trade by Using the Cold Chain in the Lao People's Democratic Republic

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Chapter 5

Inter-State and Transit Trade by Using the Cold Chain in the Lao People's Democratic Republic

Phanhpakit Onphanhdala[21]

5.1. Background of the study

The Lao People's Democratic Republic (Lao PDR) is an agriculture-based economy in terms of labour participation, and 60% of its labour force participates in agricultural activities (World Bank, 2018). However, the contribution of the agricultural sector to gross domestic product (GDP) was only 18% in 2017 (ADB, 2018). The country's major agricultural products are rice, starchy roots, sugarcane, and other crops, which are primarily products supplying the domestic market with some exports to its immediate neighbours (LSB, 2018). It is obvious that the small scale of agricultural production has experienced product loss in the supply chain. Thongsavath et al. (2012), for example, reveals that agricultural product loss was due to poor postharvest and transport in the case of cabbage for Champasak province in both domestic and export supply chains. The small scale and primary production of added value agricultural products in the Lao PDR are also due to technology and capital limitations. A survey conducted in the Lao PDR by the Japan International Cooperation Agency (JICA) in 2012 categorised added value food products, such as processed food, into three groups as *primarily processed foods* (milled rice), *traditionally processed foods* (fermented fish seasoning) and *processed foods by modern technology* (seasonings and foods packed in bottles and cans for long storage and long-distance transportation (JICA, 2012).

At present, the demand for food is increasing because of population growth and consumption diversification. Four surveys of the Lao Expenditure Consumption Survey (LECS) over the past decades have provided data on expenditure and consumption covering all seasons and relating to aspects of every area and region in the Lao PDR. Monthly household consumption is on a rising trend. When it comes to food consumption, surveys showed that carbohydrate consumption has decreased, but protein and mineral consumption, such as meat, fish, fruits, and vegetables, has increased. In other words, a variety of food consumption is playing its role. The slow growth of higher added value agricultural products in the Lao PDR cannot meet the higher demand in the domestic market. Therefore, demand for imported food from its immediate neighbours has increased, such as from Thailand, Viet Nam, and China.

Higher value-added agricultural products have been developed in many countries of ASEAN through a set of activities from production, processing, and distribution until the products are delivered to consumers' hands, which is called the food value chain (Deloitte, 2015; MAFF, 2015). Nowadays, there is considerable diversity in food consumption. The cold chain

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has been added into part of the food value chain and aims to minimise food loss and preserve food quality. The cold chain is the process of controlling products at proper temperatures, especially perishable goods that have a short shelf life. This process mainly includes precooling/freezing packaging, packing, storage, transporting (Kitinoja, 2013; GIZ, 2016). The cold chain is widely used not only in the food industry but also the cosmetic and pharmaceutical industries as well. It is useful to prevent food losses in many developing countries, where rising urbanisation causes longer distances between productions areas and consumers. Importantly, an agrarian economy, like the Lao PDR, where the expansion of labour-intensive high-added-value sectors, such as non-timber agricultural production, helps improve employment in rural areas, cold chain management is required to preserve product quality.

In the Lao PDR, cold chain operations are almost entirely at the beginning stages. For example, when producers, distributors, or traders want to transport fresh fruits, fish, and/or vegetables from one province to another province, plastic containers and ice are needed to preserve food quality instead of a proper cold chain system. Then a pickup truck will transport these products to wet markets or small supermarkets. The longer distance means more ice. As a result, when a temperature is not controlled, the colour, smell, and taste of these fresh foods will change. This implies that the quality of the products will be affected by heat and other conditions before reaching customers' hands. In addition to food loss, this also means higher food costs. High demand for the cold chain in the Lao PDR, however, does not lead to a rising number of cold chain entrepreneurs entering the market, only some large domestic logistics companies and foreign logistics companies that are involved in the cold chain business.

This raises the questions: Why don't other entrepreneurs in the Lao PDR operate a cold chain business? What are the challenges of initiating or improving cold chain management in the country? Moreover, how can the cold chain improve the higher value added of the Lao PDR's agricultural products?

In this regard, this research study aims to answer these questions by investigating the current situation of frozen foods imported from major trade partners, the situation of the logistics business, and cold chain management in Lao PDR. Moreover, it attempts to determine the advantages and disadvantages of the cold chain business and how to utilise it to develop high-value-added agricultural products for the Lao PDR.

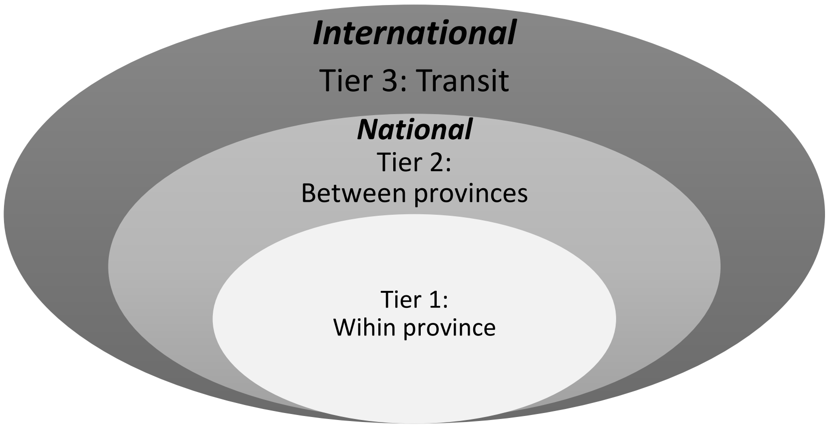
This research will integrate quantitative analysis and qualitative analysis, with additional results provided by direct observations. For the quantitative analysis, secondary data on merchandised trade, especially in high value added of agricultural products, from various domestic and international sources will be synthesised such as the ASEAN Statistics database, the UN Comtrade database, and unpublished documents. For the qualitative analysis, the Key Informant Interview (KII) and the Group Discussion (GD) will be employed to seek a deeper understanding of the supply chain and cold chain management.

The background of the study is described in Section 5.1. Section 5.2 will mention about the scope of the study based on tiers of cold chain management in the Lao PDR. Trade information focusing on food imports to the Lao PDR and regulations will be shown in Section 5.3 and Section 5.4, respectively. In Section 5.5, original findings from the KII and GD will be examined. Finally, a discussion and policy recommendations will conclude in Section 5.6.

5.2. Three tiers of cold chain management in the Lao PDR

According to the direct observations of the author, the author proposed tiers of cold chain management in the Lao PDR as shown in Figure 5.1. The classification of these three tiers is based on the level and volume of transport and the government authority level in the country.

Figure 5.1: Tiers of Cold Chain Management in the Lao PDR



Source: Author's compilation.

- Tier 1 has the smallest volume of freight transport among the three tiers. It is for internal transport within a province, which is freight transport between one district to another district in the same province. The distribution of chilled and/or frozen product(s) is carried out by pickup trucks or small trucks to local wet markets and small supermarkets in town. One reason is because these trucks are suitable for a small volume of transport and they use ice, cooling containers, and/or cooled insulated transport boxes (not a refrigerator container), which is cheaper than a proper temperature controlling system. Another reason is because of limitations on truck weights in urban areas and limitations on road accessibility in rural areas, where only smaller trucks can access.
- Tier 2 is the medium volume of freight transport of the three tiers. This freight transport is for internal transport within the country, for freight transport between one province and another province. It is counted as the informal national level of freight transport in cold chain logistics. Consolidated trucks will load chilled and/or frozen products together with various kinds of other products, then distribute them

to another province. It can be seen that sometimes consolidated trucks also play a similar role in transport as Tier 1. For example, the transport of vegetables or fishes from the Pakse district of Champasak province in the south to Vientiane, the capital. Producers or traders had packed fresh vegetables or fish into ice boxes/containers and then transported them by commercial long-distance private transport companies, such as buses. The buses would take around 12–14 hours to travel 750 km from Champasak to Vientiane, the capital. In some cases, a consolidated truck picked up these perishable products in Champasak and delivered to the central wet markets in Vientiane, then its role would stop there. In addition, the truck could play a role as a distributor to deliver these products to small wet markets.

- Tier 3 is the highest level of cold chain logistics, and massive amounts of chilled and/or frozen products are stored in proper temperature containers to preserve their original quality. This inter-state and transit freight transport operated by both domestic and foreign logistics companies. It is counted as a formal international level of freight transport in cold chain logistics. In the past, Tier 3 was only inter-state freight transport, which could be seen from the importation of frozen food products, including fruits, meat, and vegetables by the mega project in the Lao PDR, such as the Nam Theun 2 hydropower project. Furthermore, there were also imports of dairy products and ice cream for supplying to supermarkets in urban areas. At present, agricultural and food products are in high demand, both in the Lao PDR and in nearby countries. The Lao PDR not only import chilled and/or frozen foods for domestic consumption, but it is also a beneficiary in utilising its geographical advantage for transit freight transport between its immediate neighbours.

The proposed three tiers of cold chain logistics are to draw a clear visual of freight transport in the Lao PDR. Tier 1 and Tier 2 are an informal form of the cold chain, while Tier 3 is the best starter for this research study for digging for recommendations on the high-value-added agricultural sector development, as it is core for the fundamental improvement of people's livelihoods.

5.3. Overview of the situation of food imports

Currently, the Lao PDR's major trade partners are Thailand, China and Viet Nam. In 2017, Thailand accounted for almost 50% of trade[22] in goods, while China and Viet Nam accounted for around 26% and 14%, respectively (ASEAN Stats, 2018). In the past, trade with Thailand and Viet Nam comprised a small volume of consumer goods along borders. In today's world, the international trade of the Lao PDR has expanded.

Merchandised trade transactions can be seen as a mixture between two forms, such as inter-state and the transit of goods. The inter-state transport of goods is international freight transport between one country to another country. The transit transport of goods is a transit

[22] Both export and import.

of goods from one country to a third country by transiting another country. However, due to the limitation of data collection, we show the total value of goods import as a sum of inter-state and transit import value in this report.

Table 5.1: Top Three Imported Food Products from Thailand

Year	1	2	3
2017*	Pastrycooks' products[23]	Sugars and sugar confectionery	Meat and edible meat
2012	Meat and edible meat	Beverage, spirits and vinegar	Pastrycooks' products
2007	Pastrycooks' products	Miscellaneous edible products	Beverage, spirits and vinegar
2002	Beverage, spirits and vinegar	Sugars and sugar confectionery	Pastrycooks' products
1997	Cereal	Sugars and sugar confectionery	Flour and milk preparations and products
1992	Cereal	Dairy products	Miscellaneous edible products

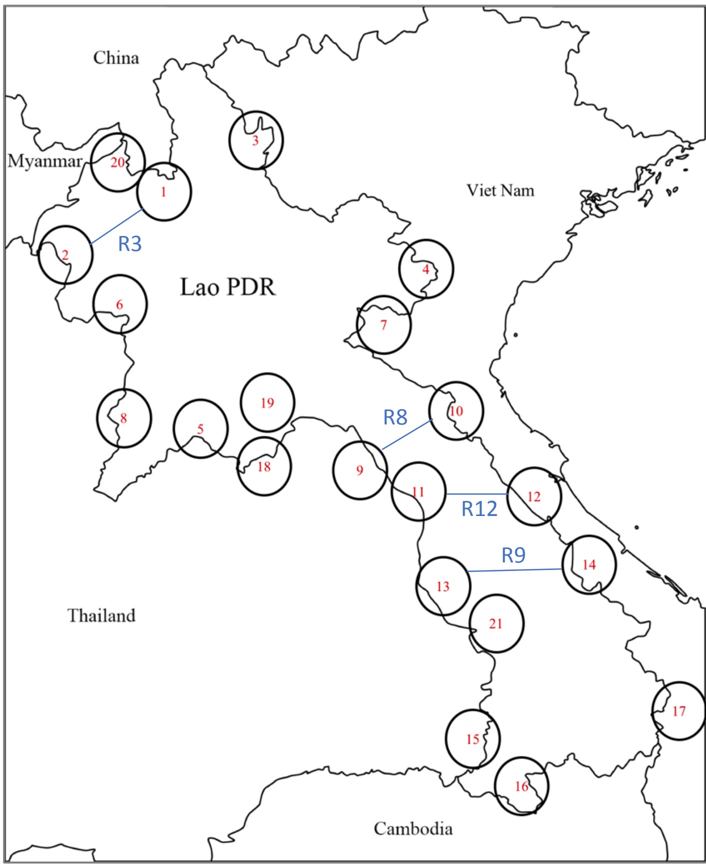
Source: *ASEAN Stats (2018), UN (2018), HS 2-digits at current prices.

The Lao PDR does not only heavily import machinery and petroleum oil from Thailand but also high added value food products. Table 5.1 shows the top three imported food products from Thailand that derived data from the Thailand side (data reported by Thailand). This is because of the limitation of trade data reported by the Lao PDR. In the 1990s, the main food products that imported from Thailand were cereal and sugar. These raw food products mainly supplied household consumption and micro local food sellers, especially in border provinces. A decade later, there was a variety of food consumption, such as beverages, vinegar, and pastrycook products. Pastrycook products are flour, pasta, cooked grain, pastry, rice paper, and others for food preparation. In the 2010s, meat and edible meat were in high demand, including both chilled/fresh and frozen meat. These were supplied to individual consumers and led to the growth of the services sector, such as hotels and restaurants.

Data shown in Table 5.2, Table 5.3 (A), Table 5.3 (B), Table 5.4 (A), Table 5.4 (B), Table 5.5 (A), Table 5.5 (B), Table 5.6 (A), and Table 5.6 (B) were obtained from unpublished documents of Ministry of Finance. Data have been collected for FY 2015–FY 2016, the final quarter of 2016, and 2017.[24] This is because a transition of statistical record regime from the Fiscal Year in 2015/16 to the Calendar Year in 2017.

[23] HS code 19 'Preparations of cereals, flour, starch or milk; pastrycooks' products'
[24] FY: Fiscal Year from October to September.

Figure 5.2: Maps of international borders



	Border	Between
1	Boten	Luang Namtha-Yunnan
2	4th Friendship Bridge	Bokeo-Chaing Rai
3	Pang Hok	Phongsaly-Tai Chang
4	Nam Soiy	Houaphanh-Nameo
5	Nam Heang	Xayyabouly-Nakaseng
6	Nam Ngene	Xayyabouly-Hua Kon
7	Nam Kan (Ninghaed)	Xiengkhouang-Nghe An
8	Phou Dou	Xayyabouly-Utaradith
9	Pak Xan	Bolikhamxay-Buengkan
10	Nam Phao (Km 20)	Bolikhamxay-Cau treo
11	3rd Friendship Bridge	Khammouan-Nakhon Panom
12	Na Phao	Khammouan-Cha lo
13	2nd Friendship Bridge	Savannakhet-Mukdahan
14	Dansavanh	Savannakhet-Lao Bao
15	Vang Tao	Champasak-Ubon
16	Nong Nokkhien (Veunkham)	Champasak-Nong Nokkhien
17	Phou Keua	Attapeu-Kontoum
18	1st Friendship Bridge	Vientiane C-Nongkahi
19	Wattay International Airport	Vientiane C.
20	Ban Mom	Luang Namtha-Pangha
21	SEZ Savan Logistics	Savannakhet

Notes: There are 27 international immigration checkpoints in total. This map does not include all international immigration checkpoints but only major ones that recorded a frozen food product movement. R3, R8, R9, and R12 denote National Roads No. 3, 8, 9, and 12, respectively.
Source: Author's compilation.

Table 5.2 shows inter-state and transit import value by the international borders of Lao PDR between the period of FY 2013–2017. Based on secondary data from unpublished documents[25], it can be seen that a massive number of frozen/chilled/fresh food products[26] requiring temperature control have been formally imported since 2015. Before this, frozen products were probably imported individually by informal traders. For example, frozen/chilled/fresh food products had been imported, then distributed to wet markets or sold them at their own minimarkets. Since 2015, a proportion of frozen/chilled/fresh food products import was more than 80% of total inter-state and transit import. The top five major borders crossed by frozen food products trade values are 1. The 3rd Lao–Thai Friendship Bridge (11), 2. The 2nd Lao–Thai Friendship Bridge (13), 3. Na Phao (12), 4. Dansavan (14), and 5. The 4th Lao–Thai Friendship Bridge (2), see the map in Figure 5.2. This implies that Thailand is a major exporter of the Lao PDR, followed by Viet Nam.

[25] Documents obtained from the Ministry of Finance.

[26] Frozen/chilled/fresh food products include mainly livestock and aquatic products, and others such as fruit and vegetable products. While this value consists of frozen, chilled, and fresh products, most of that is frozen products.

Table 5.2: Inter-state and Transit Import Values by International Border, FY 2013–2017 (US$'000)

		FY 2013/2014			FY 2014/2015			FY 2015/2016			10-11–12 / 2016***			2017		
No.	International Borders	Total values of food products	Frozen / chilled / fresh products*	Share (%)**	Total values of food products	Frozen / chilled / fresh products	Share (%)	Total values of food products	Frozen / chilled / fresh products	Share (%)	Total values of food products	Frozen / chilled / fresh products	Share (%)	Total values of food products	Frozen / chilled / fresh products	Share (%)
1	Boten	603,358.81	–	–	49.81	–	–	118,911.77	118,654.50	99.78	30,737.97	30,637.97	99.67	105,214.93	104,796.68	99.60
2	4th Friendship Bridge	12,911.15	–	–	45,222.82	–	–	320,386.52	214,182.76	66.85	104,621.09	78,704.73	75.23	423,496.43	347,333.12	82.02
3	Pang Hok	–	–	–	314.10	–	–	1,798.95	1,366.29	75.95	1,753.94	1,364.71	77.81	4,482.22	1,671.89	37.30
4	Nam Soiy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	Nam Heang	–	–	–	–	–	–	52.00	–	0.00	–	–	–	–	–	–
6	Nam Ngene	–	–	–	–	–	–	457.66	–	0.00	270.54	–	0.00	5,002.71	–	0.00
7	Nam Kan	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	Phou Dou	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	Pak Xan	–	–	–	7,335.95	–	–	18,702.46	422.40	2.26	4,676.30	224.92	4.81	23,435.34	2,354.71	10.05
10	Nam Phao (Km20)	431.25	–	–	1,021.61	–	–	652.93	51.58	7.90	277.81	–	0.00	765.04	50.76	6.63
11	3rd Friendship Bridge	122,625.65	–	–	219,585.01	–	–	1,374,354.85	1,191,849.89	86.72	176,557.91	123,108.27	69.73	1,650,120.58	1,393,682.97	84.46
12	Na Phao	3,631.81	–	–	5,257.42	–	–	795,985.92	790,870.27	99.36	127,929.86	126,072.16	98.55	349,785.32	342,179.66	97.83
13	2nd Friendship Bridge	47,691.81	–	–	58,399.23	–	–	638,571.51	577,603.64	90.45	127,795.96	113,901.16	89.13	919,570.87	840,543.60	91.41
14	Dansavanh	9,552.13	–	–	29,031.60	–	–	271,823.41	243,692.46	89.65	117,124.34	109,678.36	93.64	834,549.59	803,607.31	96.29
15	Vang Tao	9,483.06	–	–	15,676.52	–	–	19,662.52	–	0.00	10,242.66	–	0.00	26,318.21	–	0.00
16	Nong Nokkhien	–	–	–	5.05	–	–	341.86	341.86	100.00	–	–	–	–	–	–
17	Phou Keua	–	–	–	–	–	–	–	–		–	–	–	–	–	–
18	1e Friendship Bridge	25,726.99	–	–	18,835.10	–	–	37,244.41	22.30	0.06	690.48	–	0.00	15,678.11	185.54	1.18
19	Wattay International Airport	5,432.67	–	–	6,259.38	–	–	7,118.14	–	0.00	1,947.40	–	0.00	–	–	–
20	Ban Mom	–	–	–	–	–	–	–	–		–	–	–	–	–	–
21	SEZ Savan Logistics	–	–	–	–	–	–	–	–		–	–	–	–	–	–
	Total	**840,845.33**	–	–	**406,993.59**	–	–	**3,606,064.89**	**3,139,057.95**	**87.05**	**704,626.26**	**583,692.28**	**82.84**	**4,358,419.32**	**3,836,406.23**	**88.02**

Notes: *Products requiring temperature control. While this value consists of frozen, chilled, and fresh products, most of that is frozen products. **'Share' denotes as a proportion of frozen/chilled/fresh products to total values. ***'10–11–12 / 2016' denotes from October to December in 2016.

Source: Unpublished documents.

Table 5.3: Inter-state and Transit Import Values of Chilled and Frozen Products by Border, FY 2015–2017

A. In US$'000

No.	Borders	FY 2015/2016	10–11–12/2016	2017	Sub-total
Border with Thailand					
11	3rd Friendship Bdg.	390,828	153,818	394,204	938,850
2	4th Friendship Bdg.	43,862	–	118,477	162,339
13	2nd Friendship Bdg.	847	28,520	26,004	55,371
9	Pak Xan	–	–	83	83
Border with China					
1	Boten	–	–	–	–
Border with Viet Nam					
3	Pang Hok	9,320	–	3,278	12,598
Total		**444,857**	**182,339**	**542,046**	**1,169,242**

B. In '000 kg

No.	Borders	FY 2015/2016	10–11–12/2016	2017	Sub-total
Border with Thailand					
11	3rd Friendship Bdg.	8,840	7,556	14,112	30,509
2	4th Friendship Bdg.	1,376	–	8,558	9,933
13	2nd Friendship Bdg.	109	3,672	3,348	7,129
9	Pak Xan	–	–	2	2
Border with China					
1	Boten	–	–	–	–
Border with Viet Nam					
3	Pang Hok	992	–	225	1,217
Total		**11,317**	**11,228**	**26,245**	**48,790**

Source: Unpublished documents.

Frozen food products have been transported from mostly Thailand through the 3rd Lao–Thai Friendship Bridge crossing border between Khammouan and Nakhon Pranom (11). Another important border is the 2nd Lao–Thai Friendship Bridge between Savannakhet and Mukdahan (13) as shown in Table 5.3 (A) and (B). This is because Route No. 12, which goes through Khammouan province of the Lao PDR and connects Thailand and Viet Nam's borders, is shorter than Route No. 9 of Savannakhet province. Moreover, there is a significant change in transit products, such as fresh fruits from Thailand to China through the 4th Lao–Thai Friendship Bridge (2) to Boten border (1). Trade between China and Viet Nam can be seen through the route in the Lao PDR through Boten border (1) to the Pang Hok border (3). It is worth noting that the top-three trade partners of the Lao PDR are Thailand, China, and Viet Nam (Table 5.4 (A) and (B), Table 5.5 (A) and (B).

Table 5.4: Inter-state and Transit Import Values of Chilled and Frozen Products by Exporter, FY 2015–2017

A. In US$'000

No.	Export Partners	FY 2015/2016	10–11–12/2016	2017	Sub-total
1	China	–	–	338	338
2	Thailand	44,860	1,879	55,493	102,232
3	Viet Nam	960	–	–	960
	Total	**45,820**	**1,879**	**55,831**	**103,530**

B. In percentages

No.	Export Partners	FY 2015/2016	10–11–12/2016	2017	Sub-total
1	China	0%	0%	1%	0%
2	Thailand	98%	100%	99%	99%
3	Viet Nam	2%	0%	0%	1%
	Total	**100%**	**100%**	**100%**	**100%**

Source: Unpublished documents.

Table 5.5: Inter-state and Transit Import Volumes of Chilled and Frozen Products by Exporter, FY 2015–2017

A. In '000 kg

No.	Export Partners	FY 2015/2016	10–11–12/2016	2017	Sub-total
1	China	–	–	225	225
2	Thailand	10,325	1,228	26,020	37,573
3	Viet Nam	992	–	–	992
	Total	**11,317**	**1,228**	**26,245**	**38,790**

B. In percentages

No.	Export Partners	FY 2015/2016	10–11–12/2016	2017	Sub-total
1	China	0%	0%	1%	1%
2	Thailand	91%	100%	99%	97%
3	Viet Nam	9%	0%	0%	3%
	Total	**100%**	**100%**	**100%**	**100%**

Source: Unpublished documents.

Tables 5.6 (A) and (B) show the types of frozen food products. Due to the diversification of food consumption and temperature controls, it can be seen that during FY 2015/2016, the volume of frozen products was larger than for chilled products. For example, the transport of *durian fruit* from Thailand to China takes only four days by land transport thanks to the cold chain system of preserving the quality of fruits until they meet their final customers.

Table 5.6: Inter-state and Transit Import Values of Chilled and Frozen Products by Product, FY 2015–2017

A. In US$'000

No.	Products	FY 2015/2016	10–11–12/2016	2017	Sub-total
1	Frozen meat	9,222	8,496	10,727	28,444
2	Frozen salmon/fish	34,713	9,337	30,664	74,714
3	Chilled meat	1,886	879	2,801	5,565
4	Chilled salmon	–	22	35	56
5	Dried meat and fish	–	48	11,604	11,652
6	Fruit	–	–	–	–
	Total	**45,820**	**18,781**	**55,831**	**120,432**

B. In '000 kg

No.	Products	FY 2015/2016	10–11–12/2016	2017	Sub-total
1	Frozen meat	5,972	9,290	11,541	26,804
2	Frozen salmon/fish	2,893	778	3,100	6,770
3	Chilled meat	2,452	1,122	3,252	6,826
4	Chilled salmon	–	18	38	56
5	Dried meat and fish	–	20	8,314	8,335
6	Fruit	–	–	–	–
	Total	**11,317**	**11,228**	**26,245**	**48,790**

Source: Unpublished documents.

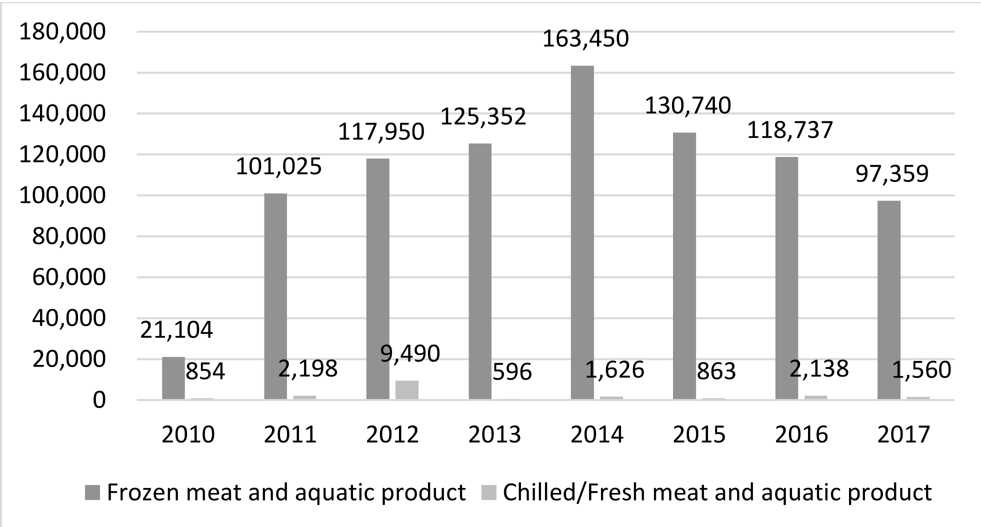
The import value of selected frozen and chilled/fresh meat and aquatic products that comprise the majority of traded items using the cold chain are displayed in Figure 3. The data were obtained from the ASEAN Stats database and reported by Thailand. They include data on the meat of bovine animals, swine, sheep or goats, fowl, turkeys, ducks, geese, fish, shrimps, and crabs.[27] It can be seen that the import value of frozen products was larger than

[27] HS codes for frozen meat are 020210, 020220, 020230, 020321, 020322, 020329, 020430, 020441, 020442, 020443, 020450, 020500, 020621, 020622, 020629, 020641, 020649, 020690, 020712, 020714, 020725, 020727, 020742, 020745, 020752, 020755, 020760, 020810, and 020830. HS codes for frozen aquatic products are 030311, 030312, 030313, 030314, 030319, 030323, 030324, 030325, 030326, 030329, 030331, 030332, 030333, 030334, 030339, 030341, 030342, 030343, 030344, 030345, 030346, 030349, 030351, 030353, 030354, 030355, 030356, 030357, 030359, 030363, 030364, 030365, 030366, 030367, 030368, 030369, 030379, 030381, 030382, 030383, 030384, 030389, 030390, 030391, 030392, 030399, 030461, 030462, 030463, 030469, 030471, 030472, 030474, 030475, 030479, 030481, 030482, 030483, 030484, 030485, 030486, 030487, 030488, 030489, 030491, 030492, 030493, 030494, 030495, 030496, 030497, 030499, 030611, 030612, 030613, 030614, 030619, 030752, and 030772. HS codes for chilled/fresh meat are 020110, 020120, 020130, 020311, 020312, 020319, 020410, 020421, 020422, 020423, 020610, 020630, 020680, 020711, 020713, 020724, 020726, 020732, 020734, 020735, 020741, 020743, 020744, 020744, 020751, 020753, 020754, and 020760. HS codes for chilled/fresh aquatic products 030211, 030212, 030213, 030214, 030219, 030221, 030222, 030223, 030224, 030229, 030231, 030232, 030233, 030234, 030235, 030236, 030239, 030240, 030241, 030242, 030243, 030244, 030245, 030246,

for chilled/fresh products. This is because they all are perishable products that have a short shelf life. There is a requirement of the cold chain to precool or freeze products in order to extend their shelf life until delivery to customers. On the contrary, the frozen vegetables and fruits import value was relatively smaller than for chilled/fresh vegetables and fruits as shown in Figure 4.[28] This included potatoes, peas, beans, legumes, spinach, sweet corn, mixed vegetables, and fruits. This is because the freezing process changes the taste of vegetables and fruits.

It is often said that cold chain management is playing an important role in high-value-added agricultural production. This system and less transport time can guarantee quality and the taste of food products that have a short shelf life. But how can the Lao PDR gain such an advantage from its geography to enhance trade integration in the course of cold chain logistics and more importantly to enhance local agricultural production in order to supply the domestic and regional markets, when the Lao PDR is an importer not an exporter?

Figure 5.3: Selected Meat and Aquatic Products, Import Value from Thailand (in US$'000)

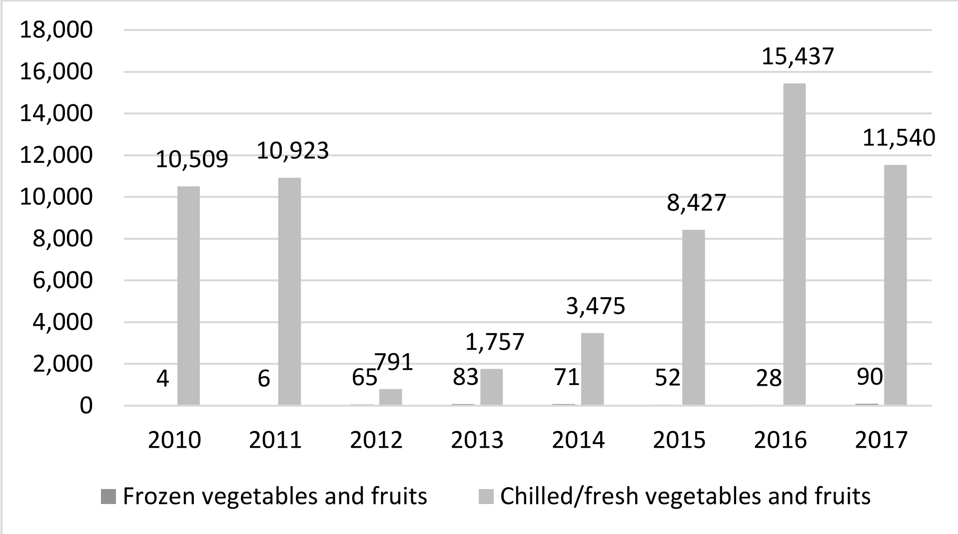


030247, 030249, 030250, 030251, 040252, 030253, 030254, 030255, 030256, 030259, 030261, 030262, 030263, 030264, 030265, 030266, 030267, 030268, 030269, 030271, 030272, 030273, 030274, 030279, 030281, 030282, 030283, 030284, 030285, 030289, 030290, 030291, 030292, 030299, 030410, 030411, 030412, 030419, 030431, 030432, 030433, 030439, 0304391, 030441, 030442, 030443, 030444, 030445, 030446, 030447, 030448, 030449, 030451, 030452, 030453, 030454, 030454, 030455, 030456, 030457, and 030459.

[28] HS code for frozen vegetables is 0710. HS code for frozen fruits is 0811. HS code for chilled/fresh vegetables are 070110, 070190, 070200, 070310, 070320, 070390, 070410, 070420, 070490, 070511, 070519, 070521, 070529, 070600, 070610, 00690, 070700, 070810, 070820, 070890, 070910, 070920, 070930, 070940, 070951, 070952, 070959, 070960, 070970, 070990, 070991, 070992, 070993, and 070999. HS code for chilled/fresh fruits are 080100, 080111, 080112, 080119, 080220, 080121, 080122, 080130, 080131, 080132, 080200, 080211, 080212, 080221, 080222, 080231, 080232, 080240, 080241, 080242, 080250, 080251, 080260, 080261, 080262, 080270, 080280, 080290, 080300, 080310, 080390, 080410, 080420, 080430, 080440, 080450, 080500, 080510, 080520, 080520, 080521, 080522, 080529, 080530, 080540, 080550, 080590, 080610, 080700, 080710, 080711, 080719, 080800, 080810, 080820, 080830, 080840, 080910, 080920, 080921, 080929, 080930, 080940, 081000, 081010, 081020, 081030, 081040, 081050, 081060, 081070, and 081090.

Source: ASEAN Stats (2018), at current prices.

Figure 5.4: Vegetable and Fruit Import Value from Thailand (in US$'000)



Source: ASEAN Stats (2018), at current prices.

5.4. Trade and freight transport regulations in the Lao PDR

International trade is relevant to inter-state and transit freight transport. Regulations related to inter-state and transit transport and regular transport were proposed for trade facilitation. It is easier to access these regulations nowadays compared to over the past decade, when most regulations were in the Lao language with difficulties in translating them into English. As we can see, there are more customs formalities that have been promulgated than transport regulations. First, this is because the Customs Department plays a major role in customs clearance. Second, there are requirements from international agencies that enforce the Lao PDR to improve soft infrastructure in order to enhance international trade integration.

Table 5.7 shows the laws, regulations, and customs formalities related to inter-state and transit transport. They have been classified by level of authority, such as law, decree, decision, instruction, notification, and official letter. Sometimes, an instruction and a notification can be promulgated at the ministry or provincial level based on the current situation. Customs formalities have general principles on export–import and the transit and movement of goods within the Lao PDR. The movement of goods also covers transit goods, temporary importation, and import for re-export vehicle and fuel. In addition, customs formalities include the *National Single Window* implementation, customs declaration, electronic customs clearance system (ASYCUDA), and fee and services charges. It can be seen that these regulations provide general principles for general goods movements but miss regulating principles related to perishable goods that require the fastest customs clearance.

In the course of transport regulations, this study categorised them by transport component, such as law enforcement, driving licence, truck standard, truck weight limitation, driving speed limitation, and measure against violators and punishment (Table 5.8). Regulations on transport are mainly authorised by the Ministry of Public Works and Transport, which include land transport and land traffic. However, these regulations provide general statements on truck limitations, but lack of regulations related to truck bans and unqualified technical trucks, etc. Measures against violators only refer to fee and fine charges and have weak statements about enforcement. On the other hand, regulations for special goods transport are limited. There are only a few types of dangerous goods, such as cooking gas, fuel, ozone depleting substances (ODS), and explosive substances. For prohibition goods that are relevant to national security, regulations are authorised by the Ministry of National Defense and the Ministry of Public Security. Furthermore, the management of consolidated trucks and cold chain logistics is limited in terms of regulations.

To sum up, regulations on inter-state and transit transport are limited and provide only general content in terms of principles, roles, responsibilities, and measures. The management of goods movement is stated in general, but it is rare when it comes to perishable goods that have a short shelf life. The statement in many regulations is rather ambiguous and unclear. In addition, regulation enforcement is weak and not integrated. Therefore, it makes implementation complicated for both relevant agencies and the importers and exporters. Some of them probably abuse the regulations gap to avoid some procedures, while some of them might struggle with the numbers of procedures, which require more cost and time.

Table 5.7: Laws, Regulations, Customs, and Formalities Related to Inter-state and Transit Transport

	Laws, regulations, customs, and formalities related to inter-state and transit transport	Official No.	Issued Date	Authorised by
Laws				
Customs				
a.	Law on Customs (Revised version)	04/NA	20-Dec-2011	NA
b.	Law on Customs (Revised version of certain articles)	57/NA	24-Dec-2014	NA
Transport				
a.	Law on Multi Transport	28/NA	18-Dec-2012	NA
Decrees				
a.	Executive Decree of the President of the Lao PDR on Fees and Services Charges (Amended 2012)	003/PS	26-Dec-2012	OP
Decisions				
a.	Decision on Implementation and Operation for the Development, Implementation and Operation of National Single Window on Customs Procedures	2109/MOF	26-Jun-2015	MOF
b.	Decision of the Minister of Finance: Declaration Form on the Use of Customs Declaration Form for Imported Goods Subjected to Duties and Taxes	2095/MOF	26-Sep-2011	MOF
c.	Decision of Acting Minister on Facility Provision for Cross-Border Goods Transportation	2184/CTPC	3-Jul-2006	CTPC
d.	Ministerial Decision on Collection of Fixed Fee for Importation of Some Goods for Exportation	0462/MOF	14-Mar-2003	MOF
Instruction/Guidance				
a.	Instruction of Governor on the Management of Transfer of Goods at International Border Checkpoint in Khammouane Province	07/G/KM	17-Dec-2015	Provincial Governor
b.	Administrative Guidance: To Issuance of Guarantee for Release of Goods by Using IM8 Regime	06893/CD	29-May-2013	MOF
c.	Instruction on Completing the Customs Valuation Form	00266/CD	4-Nov-2011	MOF
d.	Instruction: Application of ASEAN Harmonized Customs Declaration Document (ACDD)	1696/CD	17-Jun-2010	MOF
e.	Instruction on Management of Security for Temporary Importation	1456/CD	26-May-2009	MOF
f.	Finance Ministerial Instruction on Management of Refund for Security of Duty and Taxes for Temporary Importation	0153/MOF	29-Jan-2009	MOF
Notifications				

a.	Notification on the Implementation of Fee Collection of Transit Vehicles and Access of Vehicles through Lao PDR	05666/CD	27-Sep-2018	MOF
b.	Notification on the Suspension of the Permit for Import for Re-export of Vehicle and Fuel as Being Stipulated in the Minister's decision No.0462/MOF dated 14 March 2003	3431/MOF	10-Oct-2016	MOF
c.	Notification on the Management of Goods Transport through the Friendship Bridge Border Checkpoint I into Container Yard at Thanaleng Train Station	07972/CD	25-Jul-2016	MOF
d.	Notification on the Management of Export-Import of Goods through local, and traditional border checkpoint	1587/MOF	26-May-2016	MOF
e.	Notification on Administrative and Service Fee Collection for Trucks Entering the Parking Lot at International Lao-Thai Friendship Bridge I	006/LTFB.1	20-Oct-2014	MOF
f.	Notification on Attention to Manage Importation, Transit through Borders and Relocating Fuel in the Lao PDR	06304/CD	8-Sep-2014	MOF
g.	Notification on the Management of Foreign Transport Vehicles Temporary Entry in the Lao PDR	09539/PWT.C	14-Jun-2012	PWT
h.	Notification on the Implementation of Electronic Customs Clearance (ASYCUDA) at the Pilot Site at Lao-Thai Friendship Bridge I, Customs Regional Office V	1408/MOF	13-Jun-2011	MOF
i.	Notification on Regulations on Transportation of Transit Goods	0749/CTD	24-Feb-2007	MOF
Official Letters				
a.	International Transit of Goods	1242/CD	6-Apr-2010	MOF

Notes :

CD	= Customs Department
CTPC	= Ministry of Communications, Transport, Post and Construction (Old name of Ministry of Public Works and Transport)
DOT	= Department of Transport
GOL	= Government of the Lao PDR
ILTFB.1	= International Lao–Thai Friendship Bridge I
KM	= Khammouan Province (Provincial government authority)
MOF	= Ministry of Finance
NA	= National Assembly
OP	= Office of President
PS	= President of the Lao PDR
PWT	= Ministry of Public Works and Transport
PWT.C	= Cabinet of Ministry of Public Works and Transport

Sources: Policy documents listed in this table.

Table 5.8: Laws and Regulations on Transport

Laws and regulations on transport		Official No.	Issued Date	Authorised by
Laws				
a.	Law on Land Transport	24/NA	12-Dec-2012	PWT
b.	Law on Land Traffic	23/NA	12-Dec-2012	PWT
Driving license				
a.	Regulation on Management and Driving License Examination of Land Transport Vehicles	3416/MCTPC	4-Sep-2002	PWT
b.	Guideline on Request for Changing a Driving License, Using Different Types of Driving Licenses, Conditions for Using and Requesting a New Driving License to Replace a Lost License	9051/DoT	8-Oct-2002	PWT
c.	Guideline on Criteria for Applicants for Lao Citizen Driving License Examination	906/DoT	8-Oct-2002	PWT
d.	Guideline on Driving Examination Regulation	907/DoT	8-Oct-2002	PWT
Trucking standard				
a.	Provisions on the Technical Standards and Accessories of Vehicles that are Authorized for Import for Registering and Assembling for Using in Lao PDR	4312/MCTPC	11-Nov-2002	PWT
Truck weight				
a.	Regulation on Approval of Total Maximum Weight of Trucks	13848/MPWT	26-Sep-2013	PWT
b.	Decision of the Minister of Public Works and Transport on Management of Truck Weight Measurement Countrywide	20480/MPWT	29-Dec-2011	PWT
c.	Decision on the Approval of Total Maximum Weight if 22-Wheel/6-Axle Trucks (Semi-trailer trucks)	5064/MPWT	21-Apr-2009	PWT
e.	Instruction to Inspect and Manage Heavy Trucks (Weight Measurement) for 24 hours	736/MCTPC	21-Feb-2001	CTPC
Speed limitation				
a.	Links to the Law on Land Traffic, No.23/NA, dated 12/12/2012, Article 19			
Punishments				
a.	Decree on Fines and Measures against Violators of Laws and Regulations on Road Traffic, Land Transportation and Protection of National Roads	188/PM	3-Jul-2007	PWT
Transport business				
a.	Decision of Minister on Regulation Management Operate Business on Public Works and Transport	17582/MPWT	8-Aug-2010	PWT

Sources: Policy documents listed in this table.

5.5. Findings from key interviewees and group discussion

Key informant interviewees

The results of the Key Informant Interviews (KII) are employed in this research study. The interviews were conducted in October 2018. There were four respondents available for the KII. Three of them were from the Lao PDR and Thai logistics companies. One of them was a government officer in charge of the Automated System for Customs Data (ASYCDA) system, Department of Customs, Ministry of Finance, as shown in Table 5.9. Semi-structured questionnaires were prepared for obtaining information from the KIIs by focusing on the challenges of freight transport, the current situation of logistics, and the opportunity of business expansion. Direct observations focused on formal and informal forms of cold chain freight transport, soft and hard basic infrastructure along the economic corridors, market orientation, Special Economic Zones (SEZs), and two international borders with Thailand at the 2nd Lao–Thai Friendship Bridge (Savannakhet-Mukdahan) (13) and the 3rd Lao–Thai Friendship Bridge (Khammouan-Nakhon Panom) (11).

Table 5.9: List of Key Informant Interviewees (KIIs)

No.	Respondents	Person(s)
1	Department of Customs, Ministry of Finance	1
2	Lao logistics company	2
3	Thai logistics company	1
	Total	**4**

Source: Author.

There are two points to discuss about cold chain logistics based on the results from the KIIs as follows:

- Trend of transit goods

In recent years, the demand for Thai fruits and vegetables in China is on a rising trend, especially in the east and the south of China. The volume of trade has increased seven times compared to the past few years, which implies that there is a massive volume of merchandised trade flow movements between these two countries. In order to export fruits, vegetables, and related food products to China, there are two common ways for Thailand. First, via shipments from Laem Chabang seaport to a seaport in China. Second, transit transport via the Lao PDR to Viet Nam[29], and through the Lao PDR to China[30].

[29] National Road No. 8 (R8) through Bueng Kann (Thailand) – Bolikhamxay (9) to Nam Phao (10). National Road No. 9 (R9) through Mukdahan (Thailand) – Savannakhet (13) to Dansavan (14). National Road No.12 (R12) through Nakhon Panom (Thailand) – Khammouan (11) to Na Phao (12).

[30] National Road No. 3 (R3) through the 4th Laos–Thai Friendship Bridge (2) to the international border at Boten – Mohan (China) (1).

Transporting perishable products, such as fruits and vegetables, requires short distances and durations to preserve quality because the transport time directly affects the quality and taste of fruits and vegetables. The duration of goods transport from Laem Chabang, Thailand to China's seaport takes around 10 to 12 days, with almost 50% cheaper costs than land freight transport, even though the distance is longer than through the land mode. For example, 70% of *durian* exports from Thailand to China via land transport takes around 4 days in total (e.g. transport and customs clearance), by going through the 4th Lao–Thai Friendship Bridge (2). In the past, there was smuggling at a route between Houaysay, Bokeo province to China border. The KII informed that, however, goods transport inspection is strict now's a day. So, a legal trade volume between Thailand and China via this route is around 30% of total volume.

- Key factors of logistics and the cold chain and business competitors

National Road No. 12 (R12) of the Lao PDR, connecting Nakhon Panom, Thailand, to Viet Nam (11 to 12) is the main mode of transport, while the National Road No. 9 (EWEC[31], 13 to 14) and National Road No. 3 (R3) (2 to 1) are the supplementary routes informed by the KIIs. Firstly, this was because the R12 is shorter than R9 in terms of distance and time. Secondly, this was because of the bad road condition of R9 that was damaged by overweight trucks loading minerals. Thirdly, it connects Thailand, the Lao PDR, and Viet Nam, then Vung Ang seaport, for transport through the maritime mode to China and Japan. This route is also a gateway to the New East–West Corridor for North-Eastern Thailand, the Lao PDR, and Viet Nam.

The KIIs informed that the Lao PDR–China Railway Project is also a key factor that might change this business game. This railway will connect Thailand, the Lao PDR, China, Russia, and Europe by different modes of transport as a part of the One Belt One Road strategy of China. Goods transport will be changed from different modes to another. For example, transport from truck to railway to waterway and airway.

Normally, business rivals are those that come from the same field. In the course of the logistics business, land freight transport businesses are competing with each other rather than with different modes of transport. In the case of the Lao PDR, we are not competing with logistics businesses that operate transport in the land mode, but other transport modes, such as air and maritime as confirmed by the KIIs. For example, international trade between Thailand and Viet Nam is via the air and maritime modes and is rapidly growing, while the Lao PDR's land transport business growth very slow. There are two obstacles that weaken freight transport as well as trade competitiveness. The first obstacle is transit time, and the second obstacle is the high logistics costs of the relevant fees and service charges. In other words, Lao PDR companies have no choice but to compete with different modes of transport in terms of price.

[31] East–West Economic Corridor.

Cold chain group discussion

The result of the Group Discussion (GD) was also employed in this research study. The GD was conducted in February 2019. There were eight respondents from logistics companies in Vientiane, that participated in the GD. Three of them operated cold chain businesses and the rest were running general logistics businesses as shown in Table 5.10. A semi-structured questionnaire was prepared for obtaining information during the group discussion by focusing on the challenges of cold chain business and the reason why they do not operate in the cold chain.

Table 5.10: List of Cold Chain Group Discussion

No.	Participants	Person(s)
1	Operate cold chain business	3
2	Non-operate cold chain business (general logistics)	5
	Total	**8**

Source: Author.

Results from the GD revealed that both cold chain and non-cold chain business are mainly Lao PDR companies, except for one foreign company in the cold chain group. This is because cooled and frozen food products are mostly imported from the country’s immediate neighbours, such as Thailand. The GD also revealed that both are running freight transport in the land mode, covering inter-state/transit and domestic transport. Their businesses focus on freight logistics, storage, and documents declaration, such as export–import declarations and customs clearance declarations as sub-contractors for other companies. Specifically, among the cold chain companies, they operate only *cold storage/warehouses.* Information and challenges of the cold chain business are displayed in Table 11.

Table 5.11: Challenges of the Cold chain and Logistics Operations

Cold Chain Business	Non-Cold Chain Business
General information about the cold chain business	*Why don’t these companies operate in the cold chain?*
● Operating cold storage/warehouses, repackaging and being a forwarder. ● Fresh/chilled and frozen meat, frozen aquatic products, and frozen ready meals are the main products.	
Cold chain equipment and facilities	● Cold chain equipment and facilities are expensive. ● Costs of operating are high. ● The market for frozen products is limited. ● Cannot compete in the market in terms of price and transport time. ● Insufficient truck drivers who have experience in the cold chain.
● Basic equipment: forklifts, pallets, containers, four-wheel trucks, six-wheel trucks, and 12-wheel trucks. ● Cold chain: Cold storage, cooled boxes, refrigerators, thermometers, voltage stabilisers, trucks with cooling systems.	
Cold chain equipment maintenance	
● Sufficient truck parking lots and some expansion of processes. ● Trucks are above five years. ● Trucks repaired less than six times per year.	
Challenges of cold chain business	
● Price of fuel (expensive).	

• Truck condition and high repairing charge. • Bad road conditions. • Insufficient truck drivers.	

Source:_Author.

5.6. Discussion

It is important for the Lao PDR, home to 7 million residents, to gain benefits from its geographical advantage. The Lao PDR is surrounded by five AMS and one of the biggest economy nations, China. Imagine the massive volume of products and transactions between these countries if the Lao PDR can utilise its advantage for trade integration in the region.

However, instead of being an exporter of high-added-value of agricultural products, the Lao PDR is an importer of its immediate neighbours, such as Thailand. This is because the scale of agricultural production is growing slower than domestic demand. Furthermore, processed food products of the Lao PDR are currently at the primary level. Food imports are being used to fulfil this demand. Frozen meat and aquatic products are the major imported food products, together with fresh/chilled fruits and vegetables, over the last five years.

This import transaction covers both imports for domestic consumption and transit transport to third countries (e.g. China). This is an opportunity for the Lao PDR to be a beneficiary from transit transport if the country has a comparative advantage from its geographical logistics and freight transport. Unfortunately, despite a number of regulations aiming to facilitate trade in terms of customs clearance, implementation is still complicated and enforcement is weak. These weaken the capacity of freight transport in the country. In this regard, there are a couple of points for discussion as follows:

- Enhance higher added value agricultural production, such as organic fruits and vegetables, that relatively high in nutrition and price (e.g. premium and/or super food). This aims to alleviate a trade deficit with the Lao PDR's trade partners. To do this, it is important to start with land distribution, provide technical training, production technique, market access, credit access, and guarantee irrigation access to farmers.

  On the other hand, food loss means more food costs. An improvement in cold chain management within provinces instead of using primary cold transport decreases the chance of food loss. First, we can utilise the advantage of being an electricity supplier for cold storage businesses in terms of cheaper prices and electricity stability. Then, basic infrastructure, such as roads, must be improved in order to prevent damage to refrigerator containers when transporting. In this way, the Lao PDR can supply more agricultural products from provinces to provinces in the domestic market instead of more food imports.

- Another point is that regulations relating to customs and transport should be reconsidered and made a clear statement, especially to decrease customs clearance procedures for perishable goods and avoid an overnight stay because it will affect the quality of these products and lead to food loss. In addition, a deduction of customs clearance procedures of transit products is important. These regulations will be a guide for custom officers and the relevant agencies to work on determining time and collecting the exact amount of fees based on the reference rate without any negotiation.

- As well as soft infrastructure, hard infrastructure also plays an important role in logistics as well as the food value chain. Full utilisation of the upcoming Vientiane–Kunming high-speed railway project by 2021 is the most desirable, and the construction of the Vientiane–Hanoi expressway would contribute to the improvement of the cold chain.

These are to enhance the Lao PDR's capacity to compete and utilise its geographical advantage for the integration of its economy, trade, and transport in the region.

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