

**Policy Recommendation**  
**on**  
**Industrial Location in Lao PDR**

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**IDE-JETRO**

**Institute of Developing Economies,  
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# **Highlights of Policy Recommendation for Industrial Location**

## **1. Service Liberalization**

The level of service barriers in Lao PDR is higher (321.1), for instance, than Cambodia (147.8) and Lao PDR should undertake a higher level of services liberalization. A simulation with a scenario that service sectors are liberalized to the level of Cambodia in 10 years including spread effects to manufacturing sectors, the GDP of Lao PDR in 2030 will drive up to 0.31%.

## **2. Improvements in Investment Procedures**

For investment procedures in Lao PDR, it takes average 92 days, 154<sup>th</sup> out of 189 economies and should be reduced. A calibration with a scenario that developing economies conduct policy reform to the level of developed economies, the fixed cost for investors can be reduced by 36.8% and the middle-sized firms' investment is expected to increase.

## **3. Promotion of 5S & Kaizen for Domestic Firms including SMEs**

According to a survey on domestic firms in Lao PDR (201 samples), the ratio of firms practicing face to face communication (F2F) with foreign firms/suppliers is higher (17%) than the others (10%) among the firms introduced new products. Among the firms with F2F communication, the ratio of firms conducting 5S (Sort, straighten, shine, standardize and sustain the discipline) and Kaizen awareness is larger (17%) than the others (10%). Promotion of 5S and Kaizen to domestic firms including SMEs should be strongly recommended.

## **4. Increase in Accommodation Supply in Urban Areas and/or SEZs**

In Vientiane Capital, the population and firms concentrate in 10 km radius, but they spread anywhere in other provinces. In attracting firms, larger scale of population concentration is needed. In order to attract migration into 5 km radius of major urban areas and/or SEZs, supplying affordable accommodations in the area is needed. And in order to expand the urban area, providing infrastructure including transport, electricity and water in 5-10 km radius is necessary.



# Chapter 1

## **Geographical Simulation Analysis of Services Liberalization and the Overall Development of Laos**

*Ikumo Isono*

### **ABSTRACT**

Services liberalization is becoming the next important agenda for mega free trade agreements as well as for national policy. A simulation analysis using the IDE Geographical Simulation Model (IDE-GSM) developed by the Institute of Developing Economies at the Japan External Trade Organization (IDE-JETRO) indicates the manner in which services liberalization benefits the economic development of Laos. Furthermore, an additional simulation analysis leads to the policy recommendation that a strategic economic development package, which includes services liberalization, would amplify the positive economic impact on Laos.

### **INTRODUCTION**

East Asia has been developing remarkably due to its strong linkages with the global value chain. This development has been driven by foreign direct investment (FDI). In particular, the global production networks that extend beyond national borders have played a critical role in facilitating economic development. Developing countries, including Laos, have been competing in attracting FDI by investors through various incentive packages. Since the 2000s, the production networks have grown further because of bilateral and regional trade agreements. These trade agreements have included tariff eliminations and reductions, non-tariff barrier (NTB) reductions, services liberalization, investment facilitation measures, economic cooperation, and other means to attract more FDI and formulate stronger and more resilient production networks in the East Asian region. However, it is believed that these agreements have provided limited trade liberalization, except for the elimination and reduction of tariffs, whereas NTBs and service barriers remain high.

Currently, the urgent pressure for industrial upgrading and economic growth, along with rapid wage increases and newcomers catching up to the forerunners, requires a new stage of liberalization in the services sector. One wave of reform is through the Trans-Pacific Partnership (TPP)—a mega free trade agreement requiring members to achieve a high level of liberalization—and another is the China (Shanghai) Free Trade Zone, which promotes services and investment liberalization driven by China.

The argument for services liberalization in both developing and developed countries is supported by new insights from the latest studies on trade and investment. A United Nations Conference on Trade and Development (UNCTAD) report entitled *The Global Value Chains and Development: Investment and Value-added Trade in Global Economy* discusses international trade, global value chains, and value-added nexus. The report gives a new perspective for understanding the pattern of global trade in terms of value added. There are three significant findings. First, 80% of the global trade is dominated by international production networks through intra- or inter-firm transactions. Second, global value chains lead to “double counting” of the global trade data when we only observe the customs statistics. Approximately 28% of gross exports are the value added from products or services that have been generated in a third country and imported to the exporting country to form a portion of its parts and components. Finally, the trade in goods contains a large amount of services. According to the current customs statistics, although the trade in services constitutes only 20% of the gross global exports, the service trade industry creates nearly half of the value-added inputs to export products because the manufacturing of these products requires extensive services. Based on the above discussion, services liberalization will enhance the competitiveness of the manufacturing industry by providing high quality services to the manufacturing firms at a reasonable price.

A study on the China (Shanghai) Free Trade Zone (Kumagai et al., 2015) revealed that services liberalization would generate higher economic growth in China by expanding the geographical coverage of the free trade zone, whereas the regions in the country that did not adopt such liberalization and the surrounding economies would experience negative impacts. This implies the existence of a trade diversion effect and suggests that the surrounding countries, including Association of South East Asian Nations (ASEAN) countries, should use stronger political initiatives to reduce services barriers.

In this chapter, we claim that services liberalization in Laos creates higher economic growth based on our simulation analysis using the IDE Geographical Simulation Model (IDE-GSM) developed by a team of researchers at the Institute of



Developing Economies at the Japan External Trade Organization (IDE-JETRO). Furthermore, our simulation analysis leads to the policy recommendation that overall economic development together with services liberalization would amplify the positive economic impact on Laos.

## **1. THE IDE GEOGRAPHICAL SIMULATION MODEL (IDE-GSM)**

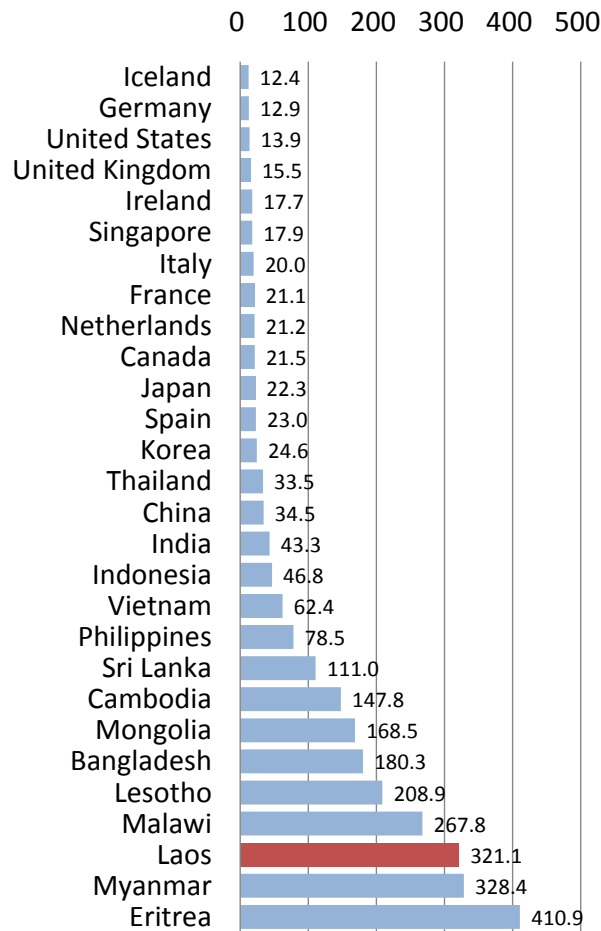
### **1.1. What is IDE-GSM?**

Since 2007, IDE-JETRO has been developing IDE-GSM. This model predicts the type of physical or institutional integration that will favorably or adversely affect regions of interest at the sub-national level. The model also predicts the impact of policy measures to facilitate international transactions on the magnitude and location of trade traffic. This enables us to identify potential bottlenecks and reap the full benefits of economic integration. This chapter provides a customized version of the model that divides Laos into 139 districts in contrast to the original version that included only 17 provincial districts in the country. The model expands the basic model of new economic geography (NEG) by incorporating numerous realistic features, such as multiple industrial sectors with intermediate inputs, a multimodal transport selection model, and the existence of tariff barriers and NTBs to international trade.

### **1.2. Services Barriers**

First, we estimated services barriers for selected countries, as shown in Figure 1. The level of services barriers in Laos is very high compared with that of other countries. The estimated services barriers include institutional barriers, procedural difficulties, the difficulty in finding partners, cultural differences, and preferential barriers associated with foreign services. Therefore, our estimates captured different types of barriers and revealed that barriers in a country could be higher than those in other countries even if a country had a higher level of commitment in the services sector through the World Trade Organization (WTO) framework or through bilateral and regional trade agreements.

**Figure 1: Services Barriers in Selected Countries (Indices)**

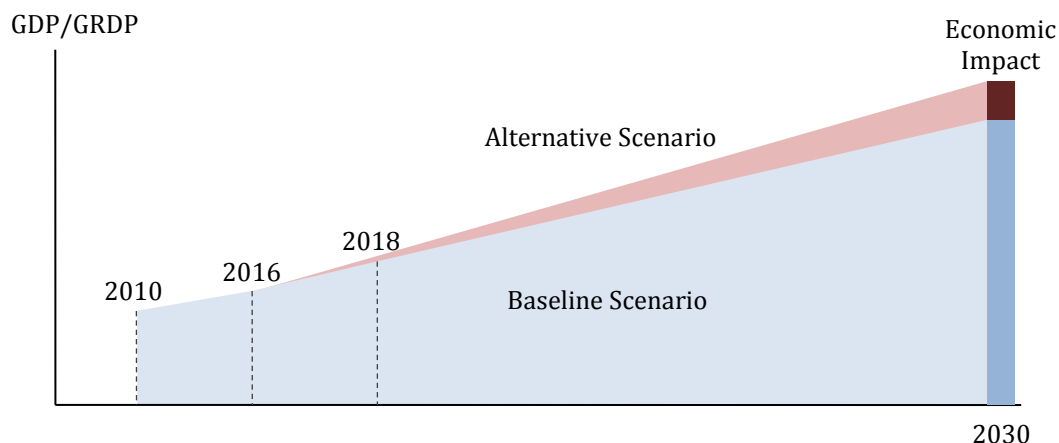


Source: Author.

### 1.3. Baseline and Alternative Scenarios

We consider the differences in national and regional gross domestic products (GDPs) between the baseline scenario and an alternative scenario (Figure 2) to calculate the economic impact of various trade and transport facilitation measures (TTFMs). The baseline scenario assumes minimal additional infrastructure developments after 2010. The alternative scenario assumes specific policy measures in 2016 and beyond. We compare the GDPs and gross regional domestic products (GRDPs) between the two scenarios in 2030. If the GRDP of a region under the scenario with specific TTFMs is higher (lower) than that under the baseline scenario, we regard this surplus (deficit) as a positive (negative) economic impact of the TTFMs.

**Figure 2: Image Diagram: Differences between the Baseline and Alternative Scenarios**



Source: Author.

## 2. SCENARIOS AND RESULTS

### 2.1. Scenarios 1 and 2: Services Liberalization

Scenarios 1 and 2 indicate that services liberalization will have a positive economic impact on a country. In both scenarios, we assume a gradual reduction of barriers in the services sector. We specify the scenarios as follows:

[Scenario 1]

Laos will lower its services barriers from 2016 to 2025 to the level of barriers of Cambodia. The NTBs to manufacturing goods do not decrease.

[Scenario 2]

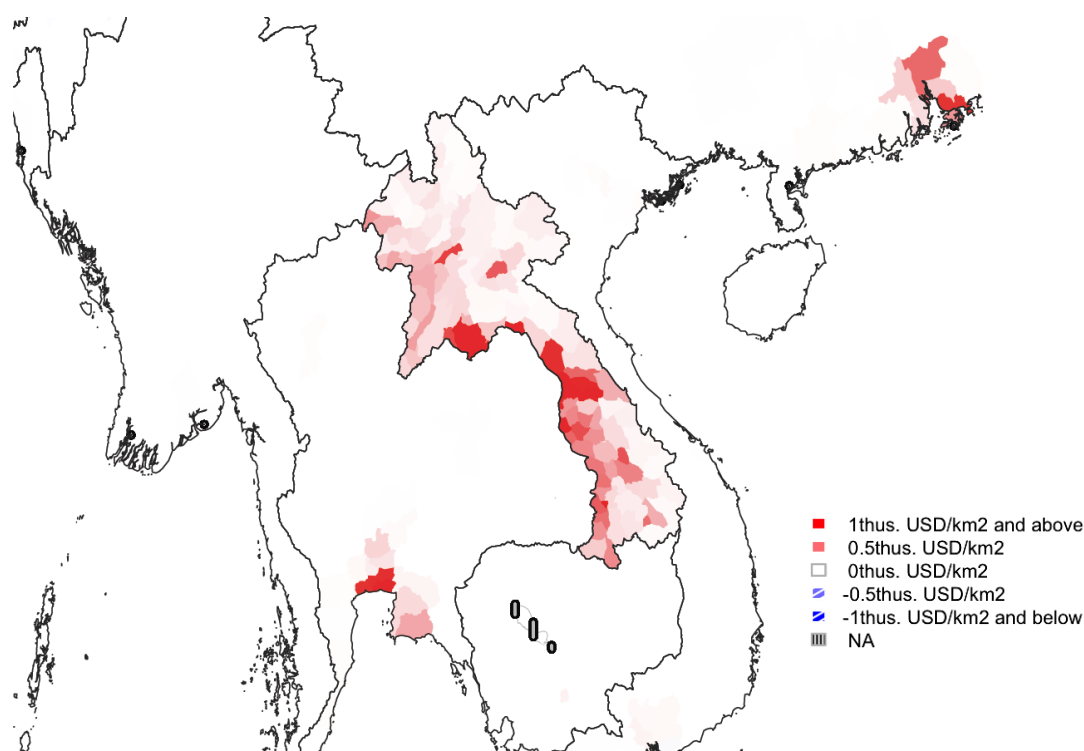
Laos will lower its services barriers from 2016 to 2025 to the level of barriers of Cambodia. The NTBs to manufacturing goods will gradually decrease as the services sector has a higher efficiency and a positive impact on reducing the NTBs to manufacturing goods.

Scenario 1, *No Barrier Reduction in the Manufacturing Sector*, is a fictitious scenario since there is no barrier lowering in the manufacturing sector, even though there are reforms in the services sector. This scenario reveals the importance of providing better services to the manufacturing sector as an input toward boosting economic activities.

The level of barriers for Cambodia is 46.0% of that for Laos. Thus, we reduce the barrier for Laos by 54.0% in 10 years; that is, from 321.1 to 147.8. In addition to the reduction in barriers in the services sector, we reduce the NTBs for the manufacturing sector to consider that services are used as an input in the manufacturing sector, as discussed in the Introduction. As a proxy, we take the ratio of the domestic service input to the output value for each industry from the input–output (IO) matrix for Thailand in the ASIA Input–Output Matrix 2005 published by IDE-JETRO. The specific values are 0.104 for the automotive industry, 0.107 for the electronics and electrical appliances (E&E) industry, 0.172 for the textile/garment industry, 0.125 for the food processing industry, and 0.131 for the other manufacturing industries. In the simulation analyses, we reduce the NTBs for the automotive industry in Laos by 5.6% ( $0.104 \times 0.54$ ) over 10 years.

The results of Scenario 2 are provided in Figure 3. Laos will experience a positive economic impact. More precisely, the reforms introduced in this scenario will increase the national GDP by 0.31% in 2030 compared with that for the baseline scenario.

**Figure 3: GRDP Differences, Services Liberalization (Scenario 2) versus Baseline (2030, Impact Density, USD per square kilometer)**



*Source:* Calculated by IDE-GSM.

In contrast, Scenario 1 produces a positive but a much smaller impact. The economic impact of Scenario 1 for Laos will be only 0.05%. This result implies that manufacturing-related services should be liberalized to create a greater economic impact. The specific sectors, such as logistics, insurance and finance, and professional services should be included in this scenario. Hotels and residential services are also important to accommodate foreign investors.

### **2.1. Scenario 3: Overall Development in Addition to Services Liberalization**

In Laos, the economic impact of liberalization in the services sector can be amplified by adding overall development projects such as road improvement, border facilitation, special economic zone (SEZ) development, and better air travel connectivity. We specify Scenario 3 as follows:

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[Scenario 3]

Laos will lower its services barriers from 2016 to 2025 to the level of barriers of Cambodia. The NTBs for manufacturing goods will gradually decrease as the services sector gains greater efficiency and has a positive impact on reducing the NTBs for manufacturing goods.

By 2018, additional development and improvement will be provided as follows:

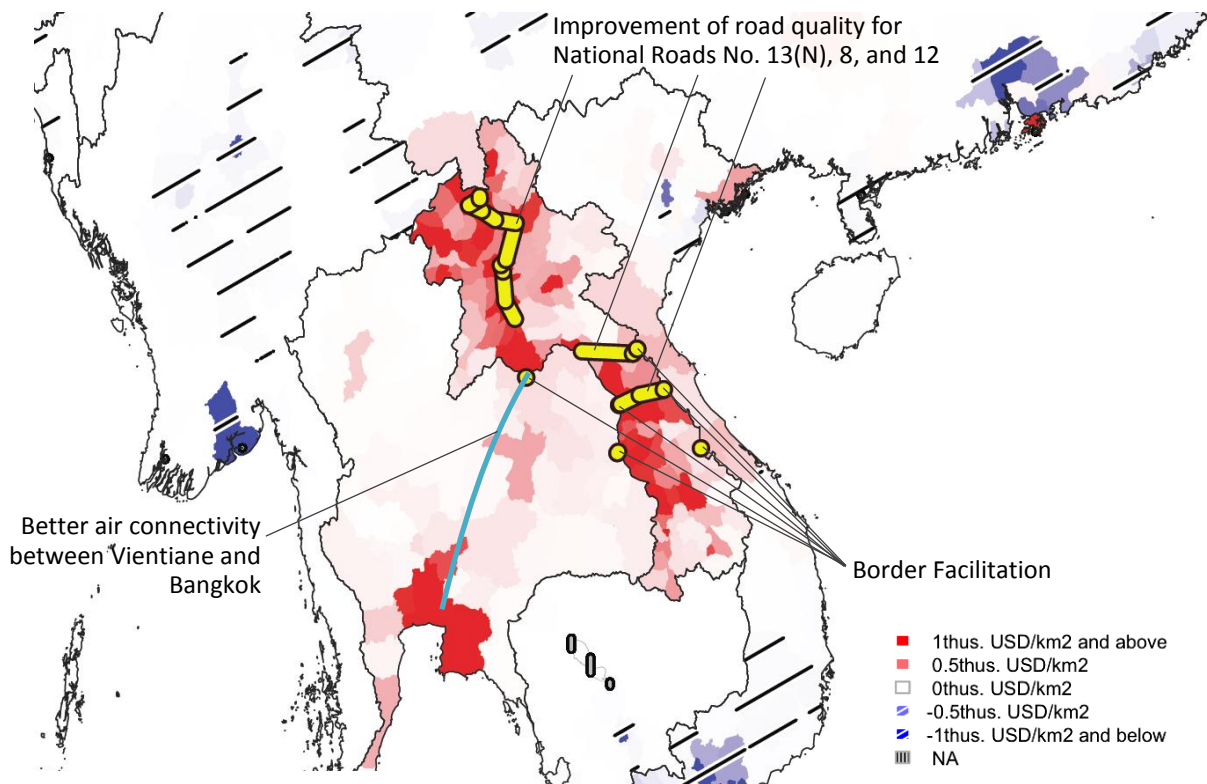
- ✧ National roads No. 13(N), 8, and 12 will be improved and the average speed of trucks will be enhanced from 19.25 km/h to 38.5 km/h.
- ✧ More efficient custom controls will halve the cost and time at specific border crossings:
  - At the first friendship bridge between Thanaleng and Nong Khai
  - Between Nam Phao and Cau Treo (National Road No.8)
  - At the third friendship bridge between Nakhon Phanom and Thakhek (National Road No.12)
  - Between Na Phao and Cha Lo (National Road No.12)
  - At the second friendship bridge between Mukdahan and Kaysone Phomvihane (National Road No.9)
  - Between Densavanh and Lao Bao (National Road No.9)
- ✧ Better air connectivity between Vientiane (Wattay International Airport) and Bangkok (Suvarnabhumi Airport) will halve the time and cost of transshipments at the Laos airport by increasing the speed of handling the goods and processing the passengers.
- ✧ Technical capacities in the specific regions are enhanced by 10% at the following

locations:

- Louang Namtha
- Vientiane capital
- Kaysone Phomvihane
- Thakhek
- Paksane
- Pakxe

Figure 4 depicts the results of Scenario 3. Almost all districts in Laos will experience a positive impact in terms of their GRDP and all districts will also have a positive impact in terms of their GRDP per capita. The overall impact on Laos will be 1.06%, which is 3.4 times that of Scenario 2 and 21.6 times that of Scenario 1. As shown in Table 1, the northern provinces such as Bokeo and Louang Namtha and some provinces sharing their borders with Thailand such as Khammouan and Bolikhamxai will experience greater positive impacts under this scenario. It suggests that these provinces have a greater potential for economic development.

**Figure 4: GRDP Differences, Overall Development (Scenario 3) versus Baseline (2030, Impact Density, USD per square kilometer)**



Source: Calculated by IDE-GSM.

**Table 1: Economic Impact by Province (2030, %)**

Province	Scenario 1	Scenario 2	Scenario 3
Bokeo	0.09%	0.17%	2.46%
Louang Namtha	0.06%	0.11%	2.43%
Khammouan	0.08%	0.81%	2.13%
Bolikhambai	0.06%	0.54%	2.10%
Vientiane	0.06%	0.30%	1.35%
Vientiane capital	0.05%	0.39%	1.30%
Phongsali	0.04%	0.09%	1.25%
Oudomxai	0.03%	0.10%	1.22%
Louangphabang	0.05%	0.14%	0.98%
Xekong	0.11%	0.41%	0.71%
Xiangkhouang	0.05%	0.17%	0.52%
Savannakhet	0.03%	0.16%	0.41%
Attapu	0.05%	0.35%	0.40%
Salavan	0.05%	0.15%	0.39%
Xaignabouli	0.05%	0.22%	0.28%
Houaphan	0.06%	0.18%	0.28%
Champasak	0.03%	0.15%	0.23%
Laos (Total)	0.05%	0.31%	1.06%

*Source:* Calculated by IDE-GSM.

Scenario 3 provides a set of measures that brings higher economic growth and regionally balanced growth. It should be noted that only regionally balanced trade measures, transportation improvements, and other such developments can make regionally balanced growth possible. In this regard, strategic and careful planning is indispensable.

### **3. CONCLUSIONS AND POLICY RECOMMENDATIONS**

Our simulation analysis revealed that services liberalization will generate positive economic impacts on Laos. We drew some policy recommendations from the three different scenarios conducted in this study.

First, non-members of the TPP should conduct services liberalization by themselves. In fact, China is active in services liberalization through the China

(Shanghai) Pilot Free Trade Zone and its expansion throughout the country.

Second, services liberalization should be at a higher level than that in the ASEAN Framework Agreement on Services (AFAS) or other ASEAN+1 FTAs. More focus is needed on procedures to provide a better investment environment for foreign service providers.

Third, services liberalization in various sectors such as wholesale and retail creates higher economic growth. In particular, services related to the manufacturing sector, such as logistics, finance, and professional services, should be designed to reduce the barriers in the manufacturing sector and gain higher economic growth.

Fourth, the economic impact of liberalization in the services sector can be amplified by adding overall development projects such as road improvement, better customs handling at border crossings, SEZ development, and better air connectivity. Careful planning is required to achieve higher economic growth in Laos, balanced economic growth among its regions, and balanced growth among its industries to ensure robust economic growth throughout the country.

## **REFERENCES**

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- Kumagai, S., I. Isono, T. Gokan, K. Hayakawa, K. Tsubota, and Keola S. (2015), “Geographical Simulation Analysis by IDE-GSM” in *China (Shanghai) Pilot Free Trade Zone and the Future of Asia*, IDE-JETRO and Shanghai Academy of Social Sciences



## Chapter 2

# Feasibility for Vientiane to Develop as a Precision and Electronics Industrial Cluster

*Masami Ishida*

### ABSTRACT

Observing cities in the Association of South East Asian Nation (ASEAN) countries that have attracted significant foreign direct investment (FDI), we enumerate the metropolitan areas with better access to ports and harbors such as Jakarta, Lagna, Cabite, Bangkok, and Kuala Lumpur. As an exceptional case, the inland province of Lamphun was successful in attracting FDI in terms of high value-added industries such as precision and electronics products. The inland logistics costs are relatively minor in the case of high value-added products and the associated land and labor costs are lower than those in the coastal metropolitan areas. Moreover, investors should be given options for both land and air transport. Applying the successful case of Lamphun to Vientiane, it is necessary to activate an air cargo service in Vientiane, while the conditions for land transport in this capital city are comparable with those in Lamphun. Policy recommendations are made after examining the feasibility of applying a precision and electronics industrial cluster to Vientiane.

### INTRODUCTION

Lao PDR is a land-locked country. A land-locked country or an inland area is disadvantageous for industrial development. Based on these facts, the question posed is whether a means for further development exist for a land-locked country. In searching for a current winner in terms of land-locked countries, we find Switzerland, which is famous for producing watches such as Omega, Rolex, and Swatch.

Why has Switzerland succeeded in producing high quality watches, which are small and high value-added products? Transport costs for such small and high value-added products are smaller than those for large and low value-added products.

Nagano prefecture in Japan is an inland area and the location of a well-developed precision and electronics industry. For instance, the headquarters of Seiko Epson Co. Ltd. is located in Suwa City, Nagano prefecture.

Are there any good examples in the ASEAN countries? In fact, most of the cities that have been successful in attracting significant foreign direct investment (FDI) are located in metropolitan areas with better access to ports and harbors, such as Singapore, Bangkok, Kuala Lumpur and the Kelang Valley in Malaysia, Jakarta-Bogor-Tangerang-Depok-Bekasi (JABOTABEK) in Indonesia, and Lagna and Cabite in the Philippines. However, Lamphun province in Thailand is an exception (Ishida, 2009).

This chapter introduces a case study of Lamphun province, which has developed high value-added industries and represents a successful inland area. We consider the feasibility of applying Lamphun's success to Vientiane.

## **1. A CASE STUDY OF LAMPHUN**

### **1.1. General View of Lamphun**

Lamphun province neighbors Chiang Mai province and it is approximately 21 km south of the center of Chiang Mai. On the other hand, Lamphun is 665 km north of Bangkok.<sup>1</sup> The Industrial Estate Authority of Thailand (IEAT) developed the Northern Region Industrial Estate (NRIE) at Lamphun in 1985. From the second half of the 1980s to the first half of the 1990s, some companies, including Japanese companies, built factories at the NRIE.

Table 1 shows the number of tenants by sector and by nationality. The major sector is the electronics industry, followed by agro-processing, jewelry and jewelry goods, and cosmetics. The majority of the agro-industry tenants are from Thailand; they supply agricultural products to the outlying cities. In contrast, the products that include electronics parts, jewelry and jewelry goods, and cosmetics have a number of common features: not being heavy or bulky and having a high value added. The industrial structure of the NRIE resembles that of a typical inland area, which includes the Nagano prefecture in Japan. However, electronic factories can be located on coastal areas or the outskirts of Bangkok, and the logistics cost is cheaper in such cases. The reasons why the tenants chose the NRIE are because the wages and land prices are lower, whereas Lamphun province belonged to Zone C where the tax exemption period was the longest.

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<sup>1</sup> The data for distances is based on the website, "Distance Calculator and Driving Directions in Thailand."

**Table 1: The number of tenants by sector and by nationality**

	Thailand	Japan	Swiss	France	the US	Taiwan	Others	J.V.	Total
Electronics		14	2					6	23
Agro-industry	6				1	1		2	10
Jewelry		1		1				3	6
Ornament	1	3							5
Cosmetics	2				1			1	4
Machinery			2					1	3
Motorcycle Part		2							2
Other Manufacturing	3	2						3	8
Services	2	1						1	4
Total	14	23	4	1	2	1		17	65

*Source:* Classified by the author with the material supplied by the Northern Region Industrial Estate on May 31, 2013.

The investments in the jewelry and jewelry goods sectors were made because of the relations with the traditional industry of Chiang Mai—cutting the gemstones mined in the mountains bordering Myanmar. A company from India and a joint venture company from Hong Kong, Belgium, and Italy use diamond-cut methods to produce metal products, whereas a company from France and a joint venture company from Thailand, France, and Switzerland produce complete and partial products in the jewelry industry. Moreover, various Japanese companies include eyeglass and lens companies that polish optical lenses and glasses for hard disk drives, an electronics company that produces switches for copying machines and buzzers for rice cookers and washing machines, and a glass company that also produces liquid crystal panels. Regarding the cosmetics sector, there is a company that produces eye pencils and the heads of makeup brushes. In addition, an ornamental company produces watch bands made of stainless steel as well as underwear accessories.

## **1.2. Logistics of the Northern Regional Industrial Estate**

For transporting such non-bulky and high value-added products, 85% of the products (by weight) is transported to Suvarnabhumi International Airport by trucks and then to Japan by air. Why is the ratio of consigners who transport by air between Chiang Mai and Suvarnabhumi so small? One reason is because the transportation cost between Chiang Mai and Suvarnabhumi (370 miles) is twice as high as that between Bangkok and Narita (2,891 miles). The former route is monopolized by Thai Airways International, whereas the latter route faces tough competition among the major air carriers. In contrast, it takes just two and a half days for door-to-door service in the case of using land transport between Chiang Mai and Suvarnabhumi, compared to one and a half days in the case of using the air transport between Chiang Mai and Suvarnabhumi.<sup>2</sup>

However, the existence of the air transport route between Chiang Mai and Suvarnabhumi cannot be discounted, even though the ratio of the consigners is just 15%. It means that some consigners who usually use the land route will use air transportation in cases of emergency. Thai Airways International provides five round trips between Suvarnabhumi and Bangkok using their Boeing 777-300 and three round trips using their Airbus A320. The freight rooms on a Boeing 777-300 provide enough space for cargoes.<sup>3</sup>

For a cluster of precision and electronics industries to develop, both land and air transport options should be provided to investors. Regarding road conditions, the road

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<sup>2</sup> An interview with the Chiang Mai branch of a Japanese logistics company dated May 30, 2013.

<sup>3</sup> As of 2013, Thai Airways provides one round trip using a Boeing 747-400 (Jumbo Jet) between Suvarnabhumi and Chiang Mai.

to Bangkok has to be well-paved and without significant vibrations. Otherwise, such vibrations could damage the precision and electronics products and cause significant losses to the investors.

## **2. APPLYING THE SUCCESSFUL CASE OF LAMPHUN TO VIENTIANE**

### **2.1. General View of Vientiane Capital**

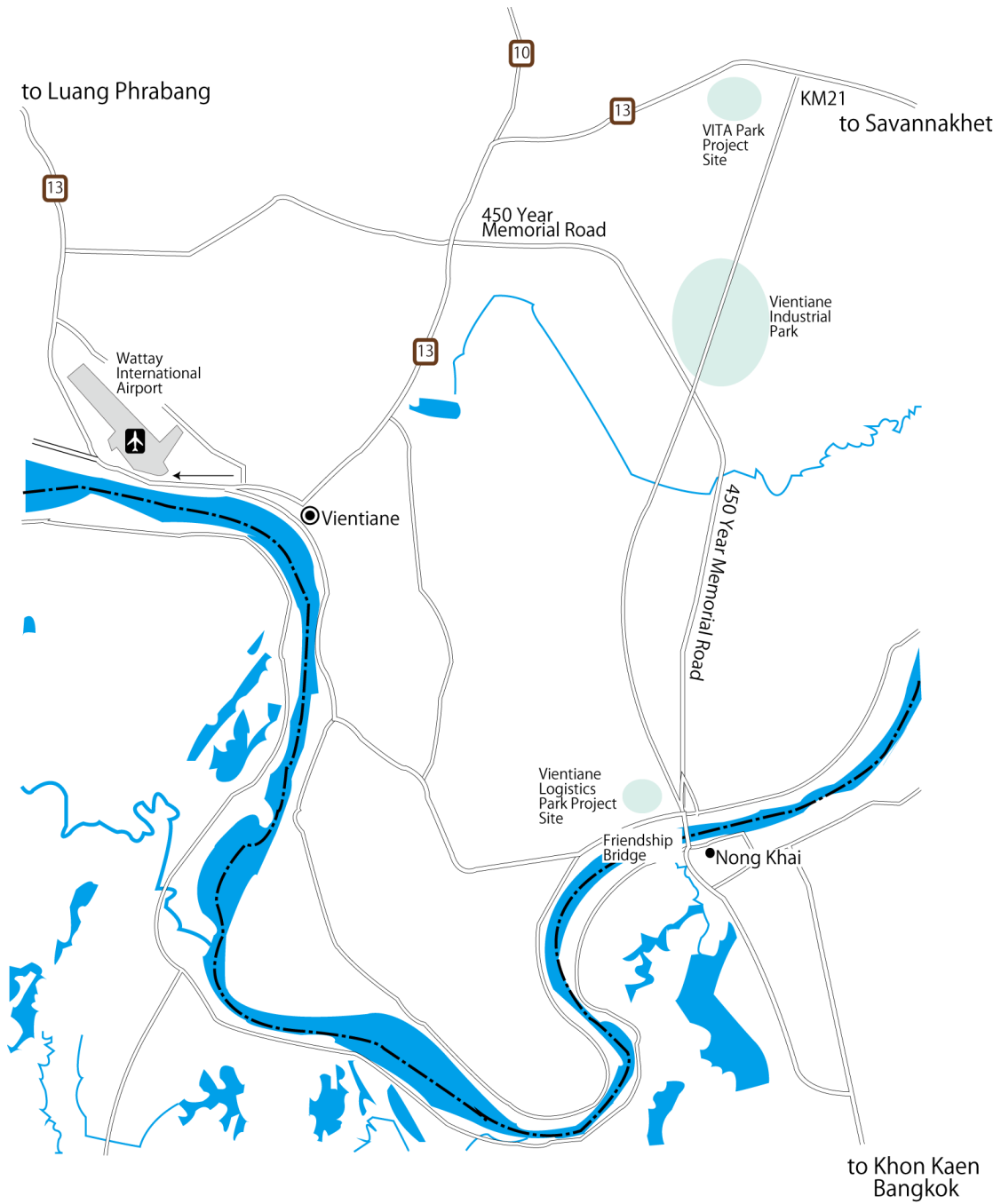
Vientiane is the capital city of Lao PDR. The total area is 3,920 km<sup>2</sup> and the population is 797,130 as of 2012 (NSO, 2013). The major national road (NR) No. 13 runs through the center of Vientiane Capital. Figure 1 shows that it descends from the upper left corner of the map (Luang Prabang is located to the north) and goes north again after passing through the center of the city. However, it descends south again further east of the map (where Savannakhet and Pakse are located). Thus, NR No. 13 connects with the other major cities in Lao PDR. If we travel to Hanoi from Vientiane, we must first go to Vieng Kham along route NR No. 13 (237 km) and then turn left on NR No. 8 (225 km). We take NR No. 8 to Hong Linh in Nghe An Province in Vietnam and then turn left onto NR No. 1 and travel straight through to Hanoi (322 km). Thus, the road distance from Vientiane to Hanoi is approximately 784 km.

On the other hand, if we travel to the southwest on the map, we come to the First Mekong Friendship Bridge between Lao PDR and Thailand. Most of the trucks in Lao PDR that transport export products go to Khlong Toey in the port of Bangkok or the Laem Chabang Port in the Chonburi Province of Thailand. The distance from Vientiane to Bangkok by road is 647 km and that from Vientiane to Laem Chabang Port is 690 km.

Five years ago, it was difficult to connect from NR No. 13 to the First Mekong Friendship Bridge without going through the center of Vientiane. In 2011, however, the 450 Year Memorial Road was constructed and it enabled one to drive from the First Mekong Friendship Bridge to NR No. 13 without going through the center of Vientiane Capital.

Wattay International Airport is located at 3 km from the Center of Vientiane Capital. There is one runway with a length of 3,000 m. At the international terminal, Lao Airlines, Thai Airways, Vietnam Airlines, China Eastern Airlines, China Southern Airlines, and Air Asia land and take off. Lao Airlines—the national flag carrier of Lao PDR—provides international flight services to Bangkok, Chiang Mai, Singapore,

**Figure 1: Map of Vientiane**



Source: Author.

Jakarta, Hanoi, Ho Chi Minh City, Yangon, Phnom Penh, and Siem Reap. In addition, it provides domestic flight services to Luang Prabang, Savannakhet, Pakse, Hoaixay, Luang Namtha, Oudomxay, Xamnuua, Xieng Khuang, and Attapeu. Lao Central Airlines, a private company established in 2010, conduct round trips between Vientiane and Bangkok as well as between Vientiane and Luang Prabang.<sup>4</sup>

In Vientiane Capital, five specific economic zones have been approved by the government, 1) Vientiane Industrial and Trade Area (VITA Park), 2) Saysetha Development Zone, 3) Thatluang Lake Specific Economic Zone, 4) Longthanh Vientiane Specific Economic Zone, and 5) Dongphosy Specific Economic Zone. Among them, the VITA Park and Saythetha Development Zone are specialized in manufacturing sectors, and the VITA Park has received several foreign investments.

In contrast, manufacturing factories can be seen along the 450 Year Memorial Road. Several factories such as Tokyo Coil and Beer Lao Brewery are located along the road connecting the center of capital and Thanaleng (First Mekong Friendship Bridge).

## **2.2. Logistics Conditions of Vientiane Capital**

The distances to Bangkok from Lamphun and Vientiane are similar, 665 km and 647 km, respectively. In other words, the truck can arrive at Bangkok in the morning if a truck leaves Vientiane at night. The road conditions between Bangkok and Nong Khai, the other side of Thanaleng, favorably compares with the road between Bangkok and Chiang Mai. NR No. 2 of Thailand was historically developed as a high standard highway in 1958 as a friendship highway (Kakizaki 2007). The high standard has been still maintained. On the other hand, the road between the center of Vientiane Capital and Thanaleng is also is a two-lane, well-paved road. The quality of road condition is evaluated to be satisfactory. The land logistics cost per 40 feet container between Vientiane and Khlong Toey Port is US\$ 1,700 while it costs merely US\$ 800 between Bangkok and Yokohama (JETRO 2015).

Alternatively, some challenges remain for truck services of precision and electronics products to Hanoi. Moreover, the demands for parts and components of the precision and electronics are high, considering that Greater Hanoi area has been a cluster of multifunction machines composed of printer, copier, scanner and fax, and mobile phones. First, NR No. 8 of Lao PDR and Vietnam includes mountainous and steep sections and is unsuitable for transporting precision and electronics products. First,

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<sup>4</sup> As of June in 2015, the operation by Lao Central Airline has been stopped.

constant efforts are required for the maintenance of the road for minimizing the vibration of transported goods. Second, 784 km between Vientiane and Hanoi is possible for “one night transportation” if passing through Thai; however, one night transportation is impossible if passing through Vietnam where the speed limit is set strictly and there exists a risk of being entrapped by the police.

Regarding providing options for air cargoes, the frequency of air transport between Vientiane and Bangkok is not comparable between Bangkok and Chiang Mai where only Thai Airways International provides five round trips of Boeing 777-300 and three round trips of Airbus A320. Table 2 shows passenger flights from/to Vientiane (more than one round trip per day). Among Bangkok, Seoul, Hanoi, and Kunming, there are agglomerations of electronics industries in Bangkok, Seoul, and Hanoi. However, the aircrafts utilized are Boeing 737-400 or Boeing 737-800, Airbus A320, A319, and A321 with six seats with one aisle in one row for economy class.<sup>5</sup> Compared with Boeing 777-400, the space at lower decks of Airbus A320 is 37.5 m<sup>3</sup> and is equal to approximately one seventh of Boeing 777-400 (Figure 2).

However, we can have optimistic views. First, it is said that the international cargo terminal has not been effectively utilized to fill in the cargo space of the aircrafts at Wattay International Airport thus far. Considering the current number of electronics companies in Vientiane and that land transport is also available between Vientiane and Bangkok, six round trips between Vientiane and Bangkok, two or three round trips between Vientiane and Seoul, and two round trips between Vientiane and Hanoi are probably acceptable. However, larger aircrafts will probably be needed if the agglomeration of electronics and precision industries are formed. Second, the number of passengers has been increasing with a growth rate of 12.7% per year, as shown in Figure 3. This implies that the government has to make efforts for increasing passengers, including tourists. Not to say Boeing 777-400, it is not impossible that Boeing 767, Boeing 787, or Airbus A330 flies between Vientiane and Bangkok or between Vientiane and Seoul.

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<sup>5</sup> Boeing 737 and Airbus A320 differ in a point that the former only treats bulky cargo, whereas A319, A320, and A321 carries Unit Load Device (ULD) container, LD-3-45WF.



**Table 2: Flights between Vientiane and Major Cities**

## &lt;Vientiane – Bangkok&gt;

Airline Company	Vientiane	Bangkok	Flight	Bangkok	Vientiane	Flight	Aircraft
Lao Airlines	7:35	8:35	(QV441)	9:35	10:35	(QV442)	A320
Lao Central Airlines	8:00	9:00	(LF065)	10:00	11:00	(LF066)	B737-400
Bangkok Airways	11:40	12:55	(PG944)	9:45	11:00	(PG943)	A319
Thai Airways International	13:20	14:25	(TG571)	11:20	12:30	(TG570)	B737-400
Lao Air Lines	18:40	19:40	(QV445)	20:30	21:30	(QV446)	A320
Thai Airways International	21:30	22:35	(TG575)	19:35	20:40	(TG574)	B737-400

## &lt;Vientiane - Seoul&gt;

Airline Company	Vientiane	Soul	Flight	Soul	Vientiane	Flight	Aircraft
Lao Airlines	0:30	7:05	(QV911)	10:40	13:50	(QV912)	A320
T' Way Air	0:50	7:30	(TW136)	20:25	23:50	(TW135)	B737-800
JIN Air	23:50	6:45	(LJ055)	19:30	22:50	(LJ051)	B737-800
JIN Air				21:15	0:35	(LJ052)	B737-800

*Note:* Only Mon., Fri., Sat. and Sun. for QV911, Mon., Tue., Thu., Fri., and Sat. for QV912, Mon., Tue., Fri and Sat. for LJ051 and LJ 052, and Sun. for LJ055. Tue., Thu., Sat. and Sun. for TW136, Mon., Wed., Fri. and Sat for TW135.

## &lt;Vientiane – Hanoi&gt;

Airline Company	Vientiane	Hanoi	Flight	Hanoi	Vientiane	Flight	Aircraft
Lao Airlines	14:40	15:50	(QV312)	16:40	17:50	(QV312)	A320
Vietnam Airlines	20:00	21:00	(VN920)	10:00	11:05	(VN921)	A321

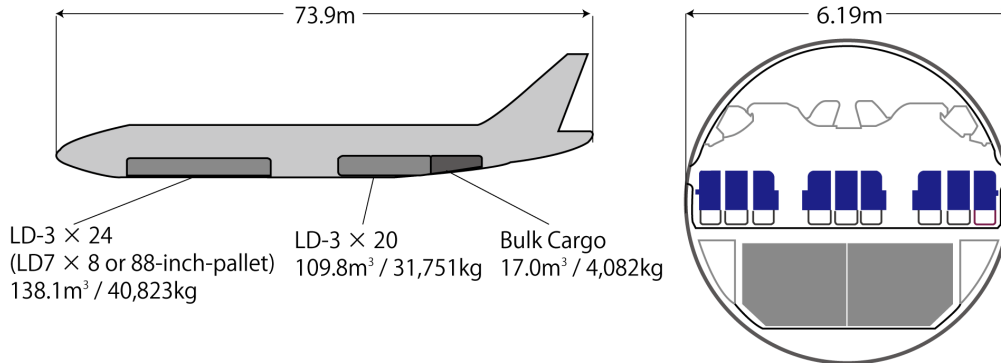
## &lt;Vientiane –Kunming&gt;

Airline Company	Vientiane	Kunming	Flight	Kunming	Vientiane	Flight	Aircraft
Lao Airlines	7:20	9:50	(QV815)	10:50	11:30	(QV816)	B737-400
China Eastern	15:30	18:00	(MU2574)	8:25	11:05	(MU783)	B737-400

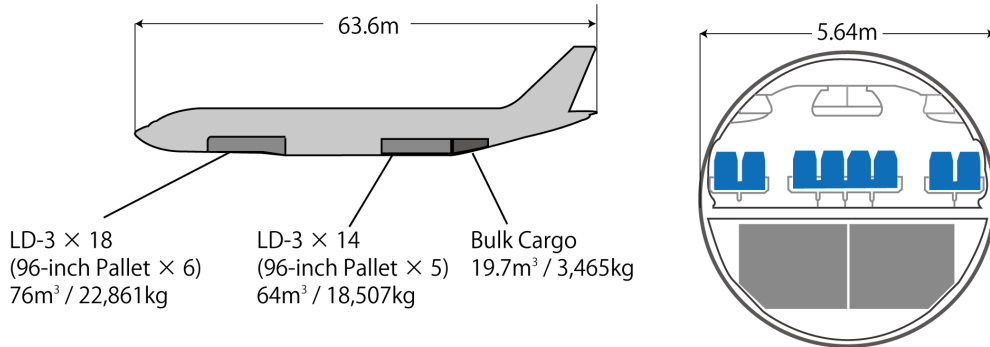
*Source:* created by the author in accordance with website of airline companies.

**Figure 2: Dimension for Cargo Space of Related Aircrafts**

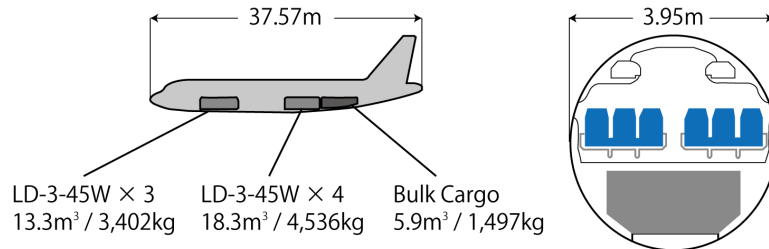
**Boeing 777-300**



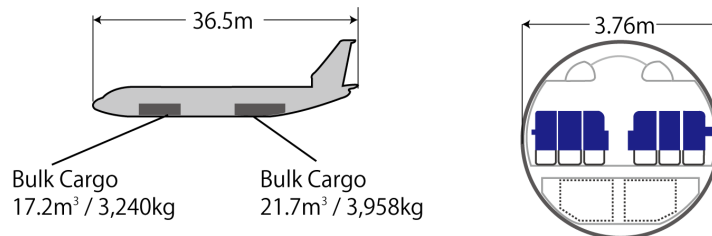
**Airbus A330-300**



**Airbus A320**



**Boeing 737-400**



Notes: 1) Ld-3 and LD-3-45W are the ATA codes of ULD container.

2) The number of cubic measures are capacities of compartments.

3) The number of weights are weight limit.

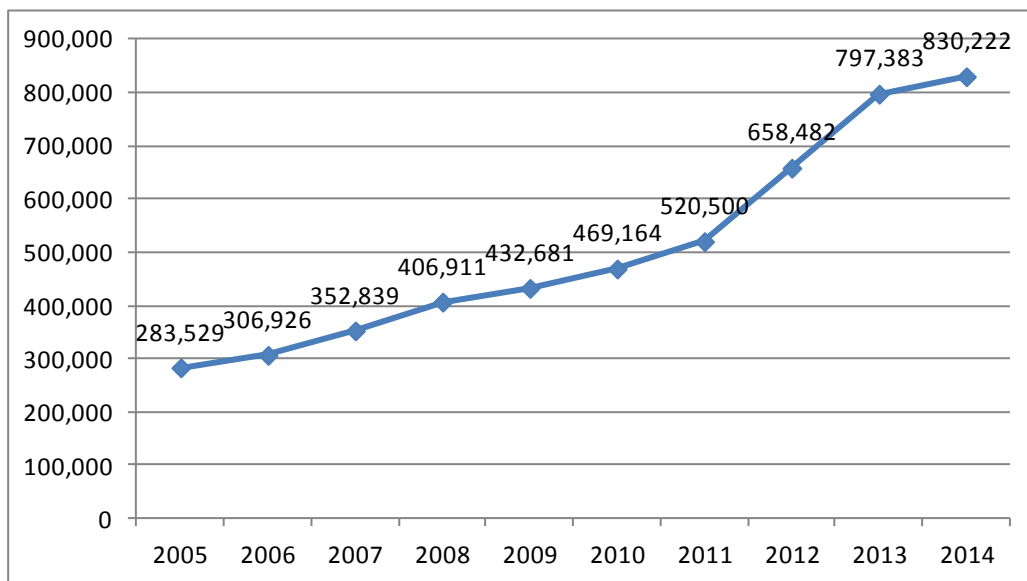
Source: Created by the author based on websites of ANA Cargo, Air China Cargo, Global Secutiry.org, Air Liners Net.

**Table 3: Fundamental Information on the Aircraft**

	Length (m)	Wingspan (m)	Height (m)	Fuselage Diameter (m)	Cabin width (m)	Take-off Field Length (m)	Number of Sheers (1 class)
B737-400	36.5	28.9	11.1	3.76	3.53	2,540	159-189
A319	33.8	34.1	11.8	3.95	3.7	1,520	134
A320	37.6	34.1	11.8	3.95	3.7	2,336	164
A321	44.5	34.1	11.8	3.95	3.7	2,180	199
B777-300	73.9	60.9	18.5	6.19	5.87	3,700	550
A330-300	63.6	60.3	16.7	5.64	5.28	2,500	440

Source: Website of Civil Aviation for fuselage diameter and number of sheets and Website of Airlines Inform for other items.

**Figure 3: Number of Passengers for International Flights from/to Vientiane**



Source: Company Profile of Lao-Japan Airport Terminal Services, Co., Ltd

### **3. POLICY RECOMMENDATION AND CHALLENGES IN FUTURE**

Several policy recommendations are enumerated as follows to succeed in forming an industrial cluster of precision and electronics products:

- 1) Provide higher tax incentives same as that of Savan-Seno SEZ (10 years tax exemption and provides lower tax rate of 8%) for new investors or investors for expansion in precision and electronics industry.
- 2) Make efforts for increasing passengers, including tourism, for airline companies to provide trips with larger aircrafts.
- 3) Make efforts for reducing cost for land transport to Bangkok.
- 4) Make efforts to create a circumstance that airline companies compete fairly and avoid a situation with one monopolistic company as much as possible.

In addition to the aforementioned policy recommendations, future challenges are enumerated. First, conduct a survey at Lamphun and interview with companies to get good suggestions for designing the cluster. Second, organize an appropriate vocational training for workers and engineers who are suitable for precision and electronics industries.

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- Central Lao Airlines: [http://www.flylaocentral.com/flight\\_schedule.aspx](http://www.flylaocentral.com/flight_schedule.aspx) (referred on May 29, 2015)
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- Global Security.org: <http://www.globalsecurity.org/military/world/civil-aircraft.htm> (referred on May 31, 2015)
- Lao Airlines: <http://www.laoairlines.com/> (referred on May 29, 2015)
- Wattay International Airport: <http://www.vientianeairport.com/> (referred on May 29, 2015)
- Thai Airways International: [http://www.thaiairways.co.th/en\\_TH/index.page](http://www.thaiairways.co.th/en_TH/index.page) (referred on May 30, 2015)
- Travelmath: <http://www.travelmath.com/drive-distance/> (referred dated on May 29, 2015)
- Distance Calculator and Driving Directions Thailand  
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## Chapter 3

# Effect of Production Factor Distribution on Industrial Location in Lao PDR

*Souknilanh Keola*

### ABSTRACT

This chapter shows how the aggregation of spatial attributes by administrative boundaries with different shapes and sizes distorts the availability of these attributes. In addition, it employs high resolution spatial data such as village-level populations, firm locations, and nighttime light observed from space to demonstrate the manner in which these attributes can explain the impact of the distribution of resources on industrial location. The results reveal that such effects decrease sharply with distance and that potential measures to promote industrial locations in Lao PDR would be to increase assessable resources through their concentrate into, and/or expansion of existing urban areas, with development of efficient transportation and other infrastructures.

### INTRODUCTION

The competition to attract firms has increasingly become a practical policy consideration for many countries and sub-national regions that seek to generate economic growth (Harrington and Warf 1995; Perkins et al. 1996; Borensztein et al. 1998). The academic literature finds that both demand and supply affect firm location (Fujita et al. 1999). In sum, firms tend to locate in places with a higher population that have, *ceteris paribus*, a greater demand for finished products and a greater supply of labor for production. The question is why, in reality, regions with similar population and labor pool rarely attract similar number of firms? For instance, the number of firms varies greatly in the capital city and major provinces of Lao PDR with a similar total population. Theoretically, agglomeration or concentration is also considered to affect firm location. The problem is that concentration is often evaluated in terms of administrative boundaries. Aggregating data using arbitrary administrative units of

different shapes and sizes is known to be problematic and has been well described in academic studies since the 1930s (Gehlke and Biehl 1934; Openshaw 1984; Briant et al. 2010). This method is now known as the Modifiable Areal Unit Problem (hereafter MAUP). This chapter shows how aggregating resources using techniques such as geographic buffering or zoning around objects of interest with the same shapes and sizes is potentially a step forward in overcoming MAUP, particularly in terms of industrial location analysis.

The rest of this chapter is structured as follows. Section 2 discusses how administrative boundaries as spatial units of analysis distort reality. Section 3 shows how geographic buffering can be used to effectively present the impact of resource distribution on industrial location. Section 4 considers potential policy measures to promote industrial locations in Lao PDR. Section 5 presents the conclusion.

## **1. HOW ADMINISTRATIVE BOUNDARIES SAY LESS ABOUT CITIES**

The size of major cities or metropolitan areas is often measured by the size of the urban population. However, this cannot be done without first defining the area to be classified as urban. Nevertheless, the definition of an urban area is far from obvious. While population density, infrastructure, and commuting areas are regularly used for this purpose, each item captures only certain aspects of urbanization. More importantly, it is very difficult to measure these items with a high degree of consistency. Crowded slums and densely populated central business districts in industrialized countries of similar population densities cannot be discussed in the same context. Structures in built-up areas can be anything from roads, houses, office buildings, etc., and be constructed using materials of greatly different quality. Commuting is determined by time rather than distance, but the distance travelled by the majority of city dwellers largely depends on the availability, quality, and relative prices of transportation infrastructure.

Following Elvidge et al. (1999), Schneider et al. (2009), and Liu et al. (2012), nighttime light from the Defense Meteorological Satellite Program-Operational Linescan System (DMSP-OLS) is employed to capture the size of major cities in Lao PDR and selected countries (Figure 1). Data obtained from DMSP-OLS is calibrated into values between 0 and 63 before making global annual data since 1992 available for download without any charge to the user.<sup>6</sup> The same colors in each city represent the same level of observed nighttime light, thereby making it possible to derive a consistent

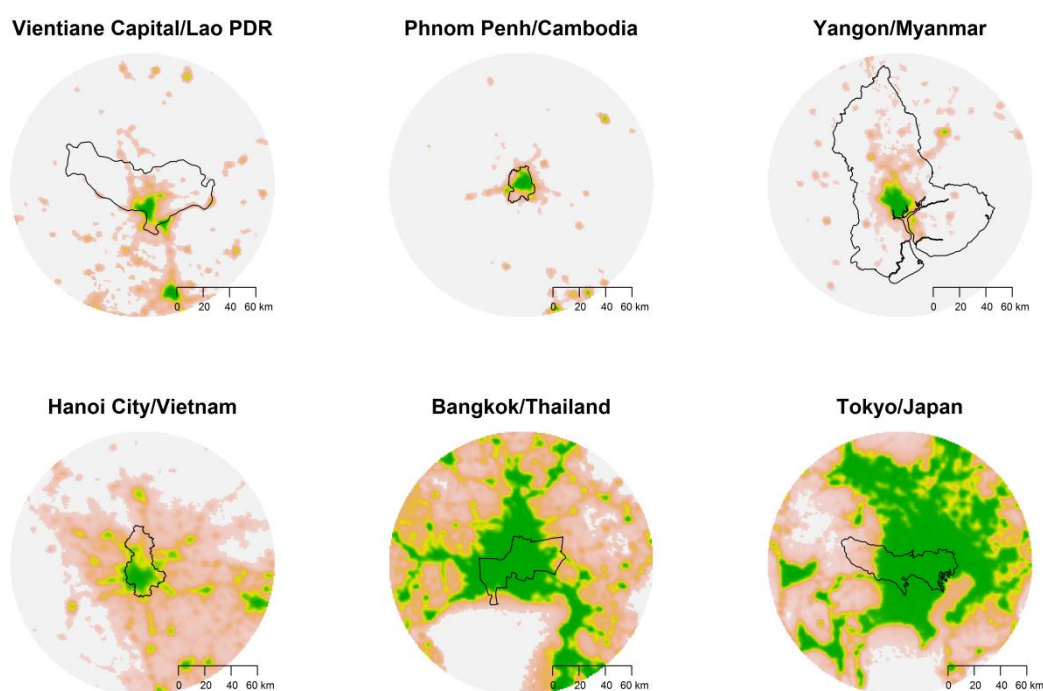
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<sup>6</sup> <http://ngdc.noaa.gov/eog/>



cross-country comparison. Each metropolitan area is displayed with the same buffer size—a circle with a 100 km radius—to make the spatially consistent comparison easier. Several observations can be drawn from Figure 1. First, metropolitan area sizes measured by nighttime light rarely coincide with administrative boundaries. Urban areas occupy only a portion of the administrative boundaries of the capital cities in Lao PDR, Myanmar and Vietnam.<sup>7</sup> In contrast, the urban areas expand beyond the boundaries of the capital cities in Cambodia, Thailand, and Japan. While the mismatch of the administrative boundary of the capital city is small in Cambodia, the mismatch is so large in the case of the capital cities in Thailand and Japan that it provides little information regarding the extent of the metropolitan areas. This adds to the already abundant evidence from other scholarly studies that administrative boundaries are problematic as a spatial unit of analysis.

**Figure 1: Administrative Boundaries and City Sizes by Nighttime Light (2012)**



*Note:* All circles have the same radius of 100 km. Yangon is selected for Myanmar to focus on industrial location. Black and blue lines represent administrative boundaries.

*Source:* Processed by author based on FAO's GAUL for administrative boundaries and NOAA's DMSP-OLS for nighttime light.

<sup>7</sup> Yangon is selected instead of the newly developed capital city because the main focus of this chapter is industrial location.

Second, despite different levels of population at both the national and city levels, the size of the core (green) and surrounding areas of the capital cities are more or less the same for Lao PDR, Cambodia, and Myanmar.<sup>8</sup> In these countries, the sizes of the core areas are similar to a circle with a diameter between 10 km and 20 km. This translates to circles with a radius between 5 km and 10 km. While the size of the core area in Hanoi/Vietnam is only slightly larger than that in Yangon/Myanmar, similar core areas in Bangkok/Thailand and Tokyo/Japan are more than several dozen times as large than Yangon/Myanmar. Third, urban areas, particularly the core parts, seem to reflect the location of major industrial clusters and transportation infrastructures. The core area in Tokyo/Japan comprises parts of the surrounding prefectures (Kanagawa, Saitama, and Chiba) and is mainly connected by major railways. Similarly, the core area in Bangkok/Thailand extends southwards along the major highway connecting central Bangkok with Bangkok's port. While the capital city population size is similar in Myanmar, Thailand, and Vietnam, the much larger extent of the metropolitan area in Thailand becomes apparent when measured by nighttime light, which accounts for the large gaps in industrial locations, built-up areas, and transportation infrastructure. In other words, city sizes measured using nighttime light provide additional information regarding the extent of urban areas compared to that using conventional measures. Nighttime light shows both the extent and level of population, industrial, and infrastructure concentrations, with precise and consistent geographical information. Such information, in particular, enables its users to be explicit about place, which is extremely important in locational analysis.

## **2. SPATIAL EFFECT OF PRODUCTION FACTORS ON FIRM LOCATION IN LAO PDR**

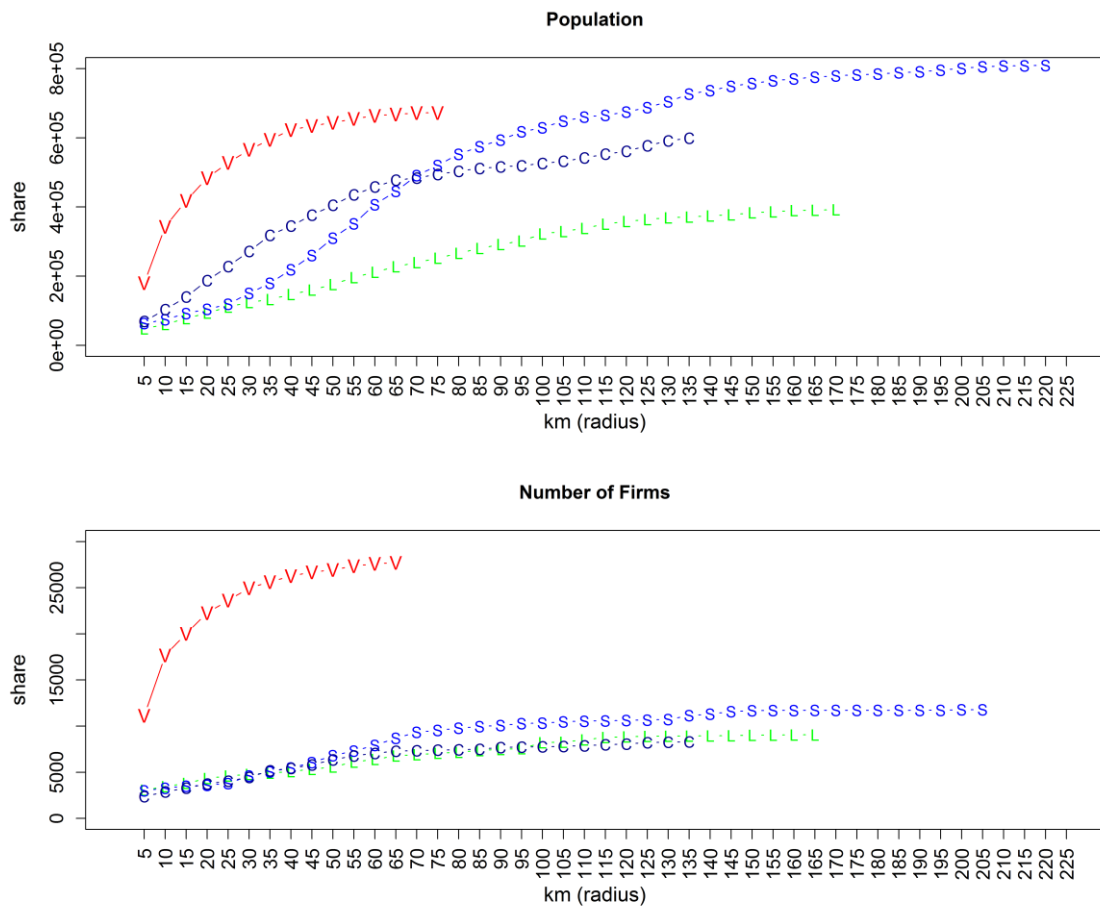
Unless transportation is costless, economically rational firms cannot locate just anywhere. The 2006 Economic Census, the first such census in Lao PDR, provides evidence on how firms tend to cluster around certain places. Figure 2 (lower diagram) depicts the accumulative number of firms by distance from the center of major provinces in Lao PDR. Since this chapter mainly focuses on industrial location, the center is consequently defined by the place with most number of firms within the capital city and each major province. On the one hand, the concentration of firms around an industrial center is obviously higher in the capital than in major provinces. Approximately 11,000 firms (40% of the total) in Vientiane Capital, 3,000 firms in

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<sup>8</sup> Yangon is selected instead of the newly developed capital city to focus on an "economic" capital city.

Louangphabang province and Savannakhet, and 2,300 firms in Champasak province have located within 5 km from the center of their respective industrial locations. In Vientiane Capital, more than 60% of firms have located within a 10 km radius of the center, while all firms were found within a 65 km radius. Firms had dispersed to a much wider extent in major provinces. On the other hand, the capital city managed to attract nearly 28,000 firms by the time the economic census was conducted in 2006. In contrast, there were only 8,000 to 11,000 firms in major provinces by 2006. In short, there were more firms concentrated within the relatively small area of the capital city than in the comparatively large area in major provinces.

**Figure 2: Firm Share by Distances from the Center of the Capital City and Major Provinces (2006)**



*Note:* Center is defined by the place with the most number of firms. C, L, S, and V denote Champasak, Louangphabang, Savannakhet, and Vientiane Capital, respectively.

*Source:* Computed by the author based on Economic Census 2006 and Population and Housing Census for locations.

The question is what causes the large disparity in industrial location between the capital and major provinces? Is the disparity due to the difference in population between the capital and major provinces? In fact, the answer is quite different if not the opposite of this notion. According to the Population and Housing Census in 2005, Savannakhet had a population of approximately 800,000 and was the largest province in Lao PDR. Vientiane Capital and Champasak province followed at approximately 700,000 and 600,000, respectively, while Louangphabang province only had a population approximating 400,000. Thus, the population aggregated at the provincial level cannot be the answer. Based on the finding that aggregating data using arbitrary administrative units is problematic, this section turns to geographic buffering, which specifies a spatial unit of analysis with consistent distances from the location of interest. Figure 2 (upper diagram) depicts the population aggregated by circle-shaped buffers from the center of industrial location, which is defined as the place with the greatest number of firms within each province. By doing so, it is found that the accumulated population by distance from the center closely follows the trend of the distribution of firm share. Approximately 200,000 of approximately 700,000 people in the capital city live within a 5 km radius from the industrial center.<sup>9</sup> In contrast, only 50,000 to 60,000 people live within a 5 km radius of the industrial center in major provinces. Increasing the radius to 10 km, nearly 400,000 people in the capital live within this distance, as compared with less than 100,000 people in major provinces. The implication of these facts on industrial location is obvious. While population in major provinces is more or less similar to that in the capital, the accessible population for the firms in terms of both consumers and laborers is significantly higher in the capital.

The distance that employees can commute largely depends on the availability and relative prices of transportation infrastructure. For instance, with one of the world's most efficient railway system, it is not uncommon for workers to commute more than 10 kilometers in the Tokyo Metropolitan Area. Here, one can often travel nearly 40 km by train at a cost of half the hourly wage.<sup>10</sup> On the other hand, it takes approximately 10% of a person's daily wage to travel nearly 10 km from the center of the capital city in Lao PDR.<sup>11</sup> Furthermore, the availability of buses also limits the daily number of passengers that may travel on this route to a few thousand. As a result, while population is a factor that attracts firms, this chapter argues that the number of potential laborers

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<sup>9</sup> Computed from the village-level population. When using grid data of the population generated by remote sensing, such as LANDSCAN, this figure increases to more than 400,000.

<sup>10</sup> Travelling from Keio-Hachioji to Shinjuku Station (39.2 km by rail) costs only 474 JPY or approximately 3.8 USD as of July 5<sup>th</sup>, 2015. In Japan, transportation costs are usually paid for by the employer.

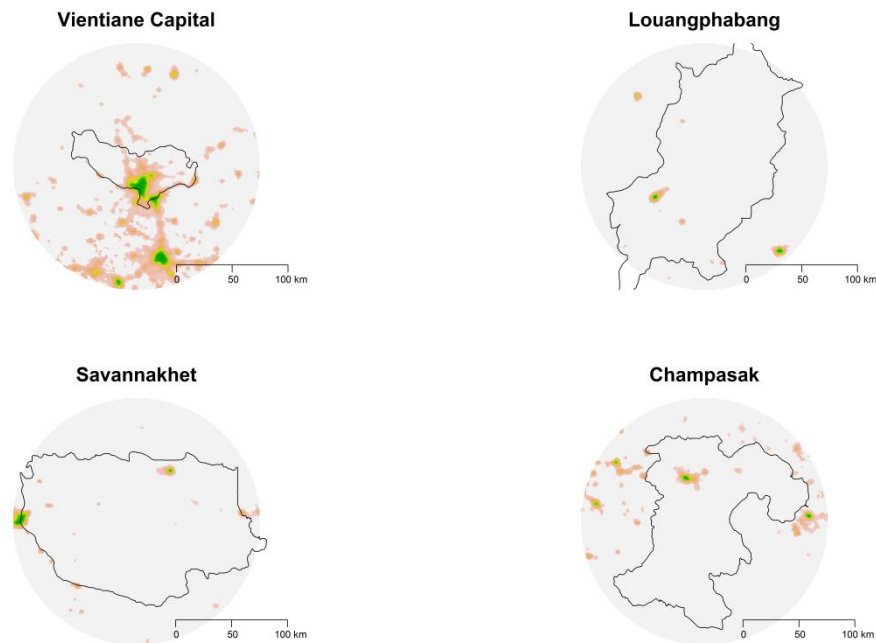
<sup>11</sup> Minimum monthly wages increased by 43.8% to 900,000 LAK in May 2015.

available in a certain location strictly depends on their distribution within a commutable range. Keola (forthcoming) terms this phenomenon the locality of industrial location and finds that in Lao PDR in 2006, the factors positively affected industrial location the most within a 5 km buffer from the village centers.

### **3. PROMOTING INDUSTRIAL LOCATION THROUGH THE CONCENTRATION OF RESOURCES AND EXPANSION OF URBAN AREAS**

Clearly, the analyses shown thus far indicate that in present-day Lao PDR, the concentration of production factors—particularly population—seems to positively affect firm location. On the other hand, the accessibility of resources by firms or the localities of industrial location also depend on the transportation infrastructure. Obviously, there are two ways to increase the resources that can attract firms to one location; namely, concentrating resources into an existing locality or establishing an efficient transportation infrastructure to increase the extent of a locality. This chapter argues that combinations of both aspects are needed in Lao PDR and discusses the advantages and disadvantages of these two options.

**Figure 3: Administrative Boundaries and City Sizes by Nighttime Light in Lao PDR (2012)**



*Note:* All circles have the same radius of 130 km. Black and blue lines represent administrative boundaries.

*Source:* Processed by author based on FAO's GAUL for administrative boundaries and NOAA's DMSP-OLS for nighttime light.

First, the relocation of resources—particularly labor—to an existing locality is both a possible and relatively easy option to undertake. The problem is that urbanization has really just begun in Lao PDR. Currently, there is virtually no place where thousands of people can move to immediately. However, there exist significant industrial clusters, including industrial estates, in neighboring countries that employ up to 100,000 employees. Thus, a realistic option in the immediate future is likely to be the concentration of a limited labor force, preferably through the provision of affordable accommodations. Second, it is obvious that urban areas within major cities in Lao PDR are very small, regardless of their administrative boundaries (Figure 3). Except Vientiane Capital, the core area (green) is extremely small and resembles a circle of only 1 km to 2 km. The lit areas at nighttime are larger, but are still more or less limited to a few kilometers. Therefore, expanding urban areas is both a necessary and potential

option. Nevertheless, while expanding the size of urban areas in major provinces to that of the capital is possible, any significant expansion beyond that size is highly unlikely in the foreseeable future. This is because the development of an urban transportation system over a large geographical area requires a huge capital investment, which is difficult for a low-income country such as Lao PDR with limited fiscal resources. In addition, a sizable number of passengers is required for efficient functioning of such large-scale infrastructures. Since the extent of major metropolitan areas such as Tokyo, which has approximately 20 million inhabitants, is more or less confined to a 100 km radius, any city in Lao PDR, which only has approximately 7 million inhabitants, is unlikely to exceed a radius of a dozen kilometers.

#### **4. CONCLUSION**

This chapter shows how the aggregation of spatial attributes into administrative boundaries with different shapes and sizes actually distorts the availability of these attributes. Moreover, the availability of resources, including the production factors, depends on their distribution and transportation infrastructure. This chapter employs high resolution spatial data such as village-level populations, firm locations, and nighttime light observed from space to demonstrate how these attributes can account for the impact of the distribution of resources on industrial location. Given that the concentration of population is still small in major provinces of Lao PDR, this chapter argues that there exist two potential ways to increase the concentration of industries into specific locations. First, supplying affordable accommodation to promote internal migration into the existing urban areas, and/or major special economic zones will increase the level of the accessible population, both as consumers and workers as well as the concentration of industry. Second, establishing transportation and other infrastructure to expand urban areas will also increase the accessible resources as well as the concentration of industry.

Finally, the implication of this analysis is the potential merit of using highly resolution spatial data. In fact, there are many more high definition spatial data that is generated from, but not limited to, satellite images. These data sources are increasingly becoming available for free or at a much lower cost. This chapter argues that using such data sources is the way forward that will help social scientists arrive at new insights, which are currently unattainable from using only administrative data.

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## Chapter 4

### Policy Reform in Investment Procedures for FDI Promotion

*Kiyoyasu Tanaka*

#### ABSTRACT

In this section, we discuss the current issues in Laos for promoting foreign direct investment (FDI). In particular, we focus on investment procedures because such institutional barriers significantly discourage inbound FDI. Furthermore, such barriers can be addressed by the Laos government through policy reforms in the short term. Next, we explain the expected impacts of policy reform in the investment procedures based on a simulation analysis of heterogeneous multinational firms (Arita and Tanaka, 2013). Our explanations highlight the importance of streamlining investment procedures to further attract foreign investors. Finally, we provide some policy implications.

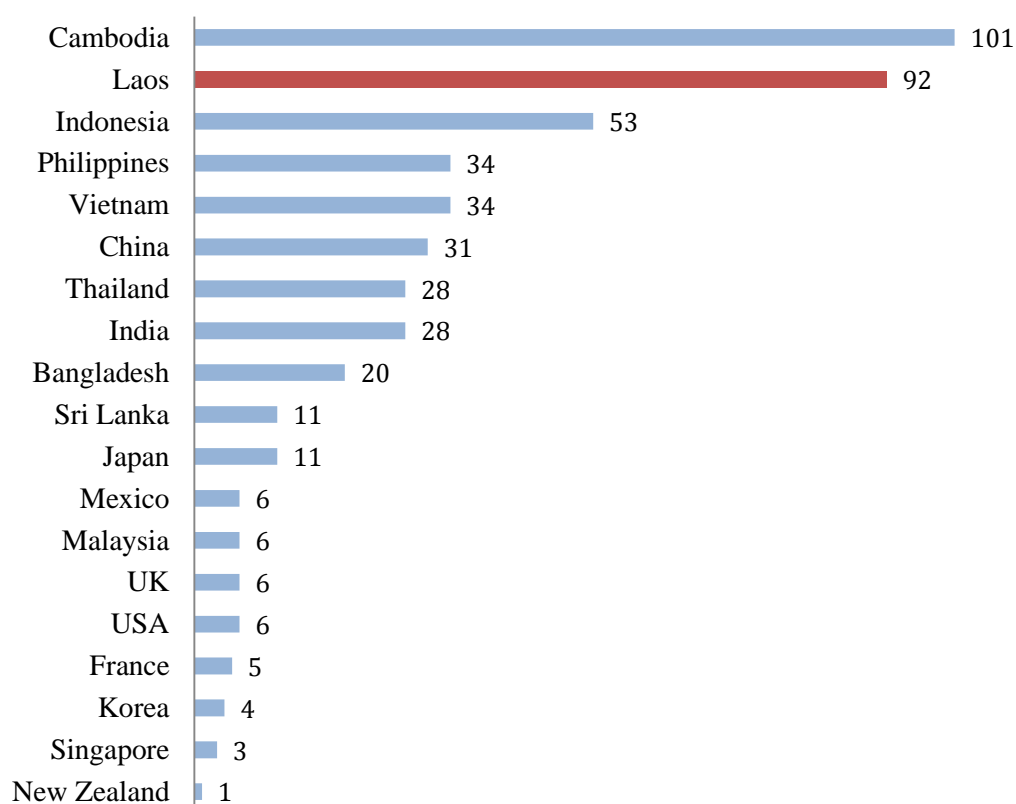
#### 1. ISSUES IN THE INVESTMENT PROCEDURES IN LAOS

To illustrate current issues in Laos for business activity from an international perspective, we use the 2014 Doing Business survey by the World Bank. In this survey, a variety of business-related issues such as contract enforcement are examined to understand the size of general business costs. In particular, the ease of starting a business is one of the most comparable and crucial indicators because all foreign investors must undergo formal registration before starting a business in virtually any economy. For instance, there are official start-up procedures to formally operate a commercial business, including obtaining all necessary licenses and permits from the local authorities and completing any required notifications and verifications for the company and its employees. To start a business, there are pre-registration, registration and incorporation, and post-registration requirements. These investment procedures require both domestic entrepreneurs and foreign investors to spend non-trivial amounts of time and money, which represent sunk costs for any business activity.

Figure 1 presents the number of days required for these investment procedures in selected economies for 2014. Through comparison, we primarily include a number of

Southeast Asian economies and some developed economies. The data indicate that, on average, it takes 92 days for starting a business in Laos. The country ranks 154<sup>th</sup> among 189 economies surveyed. In contrast, it takes less than 10 days for the developed economies such as New Zealand, Singapore, and Korea for starting a business. In terms of the Southeast Asian economies, the number of procedure days is less than 40 in Malaysia, Thailand, Vietnam, and Philippines. This implies that foreign investors would need less than half the time required to formally operate a business in these countries compared with Laos. Thus, there is evidence of greater institutional barriers for foreign investors in the case of Laos.

**Figure 1: Investment Procedure Days**



Source: 2014 Doing Business Indicator by the World Bank.

## **1.1 Some Examples in Laos**

We discuss some examples related to investment and business restrictions in Laos. First, there is a gap between the formal institutional arrangement and practical enforcement of the law and its institutions. The 2009 Law on Investment Promotion indicates that the government must issue a formal business registration to a commercial company within 10 working days of the application.<sup>12</sup> However, as is shown by the Doing Business Indicator, the actual time taken before registration issuance is likely to be much longer.

Second, the 2014 survey of Japanese firms in Laos by JETRO suggests that the Laos government officials do not completely comply with the legal and institutional arrangements, thereby increasing local business costs for foreign investors. There are frequent amendments and revisions in the corporate and tax laws, and foreign investors are not fully notified of these changes. Additionally, there are cases where the local authorities do not address the foreign investors' business-related issues in a reasonable manner.

## **2. EXPECTED IMPACTS OF POLICY REFORM IN INVESTMENT PROCEDURES**

The previous discussion highlights the issues in investment procedures, and thus suggests the need for the Laos government to implement policy reforms in these areas. To understand the potential benefits of such policy reforms, we discuss related issues for FDI promotion and illustrate the expected impacts on multinational activity based on the simulations in Arita and Tanaka (2013).

### **2.1 Why Policy-related Barriers?**

As is well known, foreign firms consider a wide range of factors in making direct investments, including not only the investment costs related to institutional and regulatory barriers but also market size, factor endowments, transport costs, infrastructure quality, macroeconomic stability, and so on. Empirical evidence for these FDI determinants has been shown in many previous studies (Blonigen, 2005; Barba Navaretti and Venables, 2004). Among the alternative determinants, market-seeking and efficiency-seeking motives constitute a fundamental incentive for multinational manufacturing firms to directly invest in a foreign market (Markusen, 2002). This

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<sup>12</sup> Note that the required number of days for issuance depends on the type of investment.

suggests that the first-order determinants of FDI are the potential market size and production costs in the host country. However, these market characteristics only improve in the long term and do not change in the short term. Moreover, it is a challenging task for the government to improve the market size and factor endowments. To highlight plausible policy reforms that can be implemented in the short term, we argue that it is crucial to focus on the role of policy-related barriers for foreign investors.

## **2.2 Simulation Analysis of Multinational Firms**

We employ a structural approach based on the work of Arita and Tanaka (2014), where a firm-heterogeneity model is calibrated to match the data on Japanese multinational firms. We design a hypothetical experiment in which only developing countries reduce their investment barriers, but the investment costs in developed countries remain constant. We exploit the length of the investment procedures for foreign investors. To assess the impact of policy measures on investment costs, we assign a fixed cost to the time taken for the investment procedures. Using the estimated elasticity between these measures, we apply our estimated policy-related barriers to our counterfactual experiments. Comparing the baseline and counterfactual simulations of firm-level multinational activity, we demonstrate the response of multinational activity to the policy reforms in developing economies.

### *Main Findings*

First, policy reforms in the investment procedures significantly increase the aggregate number of entries and the sales of the multinational firms in developing economies. As such policy reforms directly decrease the initial entry costs for foreign firms, the impacts are larger at the extensive margin than at the intensive margin. Furthermore, the greater magnitude of policy reforms leads to a larger number of entries of foreign firms and greater multinational production in the developing economies.

Second, we find that individual firms respond differently to falling investment costs in the developing economies. Table 1 presents the extensive margins of the baseline case and the counterfactual changes from the baseline case due to our experiments. Note that these firms are simulated from the calibrated model to match a sample of Japanese firms. Except for the top 1% group, the more productive firms in the 20%–99% groups are more likely than the less productive firms to establish new foreign affiliates in the developing economies following policy reforms in the investment procedures. The percentage point changes show that firms in the 30%–50% groups

experience the largest growth rates at the extensive margin. Among the potential producers below the cutoff productivity levels for entering a foreign market, declining entry costs encourage more productive firms to invest in a wider range of markets. Policy reforms increase the number of foreign entries of the most productive firms only modestly because these firms already penetrate many markets.

**Table 1: Extensive Margins of Multinational Activity in Developing Economies**

Initial Group	Productivity (percentile)	Baseline	Experiment 1			Experiment 2		
			(1)	(2)	(3)	(4)		
			Change from Baseline	from Percentage Change	Point	Change from Baseline	Percentage Change	Point
0–10		36	–20	–54.7	–19	–53.6		
10–20		45	–6	–13.6	0	0.0		
20–30		58	26	44.3	32	54.7		
30–40		77	36	47.0	62	80.1		
40–50		107	48	44.6	80	74.4		
50–60		153	56	36.5	101	66.1		
60–70		240	72	30.0	121	50.3		
70–80		403	95	23.6	163	40.4		
80–90		814	130	15.9	214	26.3		
90–99		2,446	126	5.1	355	14.5		
99–100		1,018	15	1.5	82	8.1		

*Note:* The figures in the baseline case indicate the cumulative number of markets penetrated by all multinational firms in the corresponding productivity group.

*Source:* Arita and Tanaka (2013)

**Table 2: Intensive Margins of Multinational Activity in Developing Economies**

Initial Group (percentile)	Productivity Baseline	Experiment 1		Experiment 2	
		(1)	(2)	(3)	(4)
		Change Baseline	from Percentage Point Change	Change Baseline	from Percentage Point Change
0–10	190	74.5	39.3	135.0	71.1
10–20	215	54.9	25.5	233.4	108.5
20–30	235	45.8	19.5	98.7	42.0
30–40	276	91.0	33.0	106.8	38.7
40–50	344	83.3	24.2	137.4	39.9
50–60	423	127.8	30.2	156.9	37.1
60–70	582	157.3	27.0	235.4	40.4
70–80	852	167.9	19.7	201.7	23.7
80–90	1,479	225.5	15.2	343.9	23.3
90–99	4,820	529.5	11.0	347.8	7.2
99–100	24,349	28.8	0.1	802.3	3.3

*Notes:* The figures in the baseline case indicate the average sales of foreign affiliates in developing economies across the corresponding productivity groups. Intensive margins are measured in millions of yen.

*Source:* Arita and Tanaka (2013)

In terms of the intensive margin, Table 2 demonstrates that the less productive firms tend to experience a higher growth of foreign production in the developing economies than more productive firms do. Nevertheless, such impacts on foreign sales per multinational firm are less clear-cut in magnitude across productivity levels, partly because falling entry costs directly increase their entry into developing economies but indirectly encourage their existing production in these markets.

### 3. POLICY IMPLICATIONS

The discussion up to this point suggests policy implications for the Laos government to promote inward FDI and thus economic growth.

- Institutional reform in the investment approval processes is crucial for investment promotion. Actual investment procedures are complex and require a variety of business-related documents. For instance, the submission of few documents such as proof of an office rental contract may take a long time, thereby causing delays in investment approvals. We recommend that one must be careful when considering policy reforms that streamline the investment procedures.
- Transparency in the investment regulatory framework is crucial for investment promotion. While it is reasonable to maintain a negative list of foreign investment in some sectors, the clear definition of the regulated sectors should be made public. A comprehensive and reliable list for approving foreign investment should reduce the uncertainty of investment approval, thereby encouraging FDI.
- However, a simple reduction of investment approval procedures is not recommended when there are potential negative impacts on the environment and health. Foreign investment in mining and electricity power generation may have unintended consequences for human welfare. Institutional reform should also consider the careful monitoring and examination of the environmental impact of foreign investment.

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## Chapter 5

# Nurturing the Kaizen Culture for Capacity Building of Lao Firms through Buyer–Supplier Face-to-Face Interactions

*Yasushi Ueki\**

### ABSTRACT

Globalization and East Asian economic integration initiatives are expected to provide firms in Lao PDR with more opportunities to enter into international production networks and obtain new technologies from abroad. However, firms in developing countries face difficulties in building collaborative relations with foreign buyers and suppliers, which hamper the transfer of knowledge to Lao local firms. How can firms in Lao PDR realize the potential benefits from the economic integration initiatives? This study investigates the characteristics of firms in Lao PDR who receive technology transfers from their foreign buyers or suppliers, with the objective of deriving the associated policy implications. The findings from this study suggest that Lao PDR should promote an international exchange of engineers, the Kaizen (continuous improvement) initiatives of 5S (Sort, Straighten, Shine, Standardize, and Sustain the discipline) and associated quality control methods, and international cooperation for capacity building of local business support organizations.

### 1. INDUSTRIAL DEVELOPMENT IN PRODUCTION UNBUNDLING

Lao PDR is attracting more attention as an emerging production base for Japanese firms operating in Thailand. Labor shortages and the resulting wage increases in Thailand encourage firms to relocate their labor-intensive processes to Lao PDR, while dedicating their existing capital-intensive operations in Thailand. A particular pattern of this international division of labor is called the “Thailand plus One” corporate strategy

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\* This study is based on a series of research projects on innovation conducted by the Economic Research Institute for ASEAN and East Asia (ERIA) in cooperation with the Institute of Developing Economies (IDE-JETRO). It also depends on the collaboration with Xaysomphet Norasingh and his research team at the Economic Research Institute for Trade, Government of Lao PDR. The author thanks Masami Ishida and Tomohiro Machikita for their comments. The views expressed in this study are those of the author and do not necessarily reflect those of the organizations.

(Ishida and Yamada, 2015) wherein a firm in Thailand divides its vertically integrated production line into production service blocks and redeploys each block to the most suitable location. Even though Thailand plus One enables firms to make each production activity more efficient, the firms need to coordinate their production activities in different locations by sharing the service link costs (e.g., transportation, telecommunications, tariffs, and trade procedures) to optimize the entire production network.

The high cost of complex coordination among production blocks hinders the development of the Thailand plus One type division of labor. However, firms in Thailand are extending the complex division of labor to Lao PDR. How can firms realize the potential benefits from the fragmented production between Thailand and Lao PDR? Fragmentation theory illustrates that production unbundling occurs because of the drastic reduction in transportation costs due to the technological revolution such as containerization as well as the reduction in coordination costs due to the revolution in information and communications technology (Baldwin, 2011). In the case of Thailand plus One, bilateral cooperation, subregional cooperation under the Greater Mekong Subregion (GMS) initiatives, and international cooperation have been making great strides in developing transportation and communication infrastructure and facilitating cross-border trade to decrease broadly defined transportation costs.

There are numerous cases of Thailand plus One (e.g., Toyota Boshoku in the Savan-Seno Special Economic Zone in Savannakhet Province) that are related to Japanese investments from Thailand due to intra-firm fragmentation. This situation will raise concerns among Lao businesses that such subregional integration may only benefit the multinational enterprises (MNEs). In reality, foreign-owned firms govern the production networks extending to Lao PDR because Thailand plus One is a part of the procurement strategy of international firms. Firms in Lao PDR need to enter into the MNE's intra-subregional networks to reap the full benefit of the subregional integration initiatives.

From the perspective of Lao PDR, its national development strategy as well as the subregional and ASEAN integration initiatives will improve the business environment and attract foreign direct investment (FDI) not only from Thailand but also worldwide (including neighboring countries such as China and Vietnam). The country expects that FDI will lead to an export-oriented manufacturing base and transfer technologies to the local businesses through the international production networks. However, the potential benefits are conditional on local firm participation in these networks.

Because Lao PDR is traditionally an agricultural country, local businesses have no experience in manufacturing aimed at foreign markets. Therefore, appropriate policies should be formulated to foster and support the local manufacturing firms. To formulate appropriate policies, this study provides a profile of the characteristics of the Lao local firms who participate in the international production networks and receive technology transfers through buyer–supplier relationships.

## **2. BUSINESS UPGRADING IN LAO PDR IN PRODUCTION UNBUNDLING**

Effective industrial policies can be formulated on the basis of the evidence from empirical studies. Analysis of industrial development in fragmented production networks requires more detailed firm-level information on performance and various management practices as well as buyer–supplier relationships than those available from a standard economic census. However, the availability of statistics in Lao PDR is very limited. This study uses an original dataset that contains 201 observations composed of 105 100% locally owned firms and 96 foreign-owned firms. The dataset was constructed using the questionnaire survey conducted by the Economic Research Institute for ASEAN and East Asia (ERIA) in cooperation with the Economic Research Institute for Trade (ERIT) in Lao PDR and the Institute of Developing Economies (IDE) at the end of 2012 and the beginning of 2013.

This study considers industrial development as the upgrading of business activities by existing firms rather than the increase in the number of startups related to existing and new industries. The fundamental issues for an industrial development strategy for production fragmentation are (1) whether firms in Lao PDR upgrade their business activities, (2) whether international production networks function as a conduit to transfer technology, and (3) who can participate in international production networks to receive technology transfers through interactions with engineers in foreign countries.

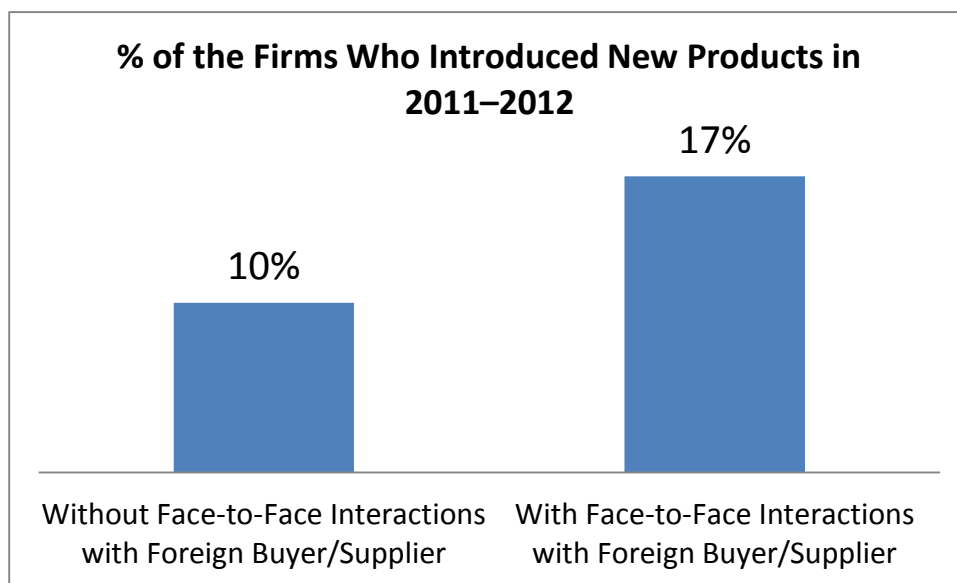
This study uses the variable for the introduction of a new product based on new technologies to the respondent firms in the 2011–2012 period as an indicator for the upgrading of business activities. Technology transfers via production networks are measured based on face-to-face interactions with engineers in foreign countries. Such interactions include meeting with engineers of business partners (i.e., buyers or suppliers) at the respondents' or counterparts' sites to provide or receive technical support. Among the various potential determinants for entering into buyer–supplier cooperative relationships, this study focuses on the adoption of the 5S (Sort, Straighten, Shine, Standardize, and Sustain the discipline) approach, which is a fundamental

practice of Japanese Kaizen (continuous improvement) and total quality management (TQM). This indicator is selected on the assumption that quality control will be the most difficult requirement for firms in Lao PDR among the various requirements from international buyers (including cost and delivery). Importantly, firms can implement 5S without bearing a great burden of capital investment.

Figure 1 illustrates the relation between the introduction of a new product and face-to-face interactions with foreign business partners. Among the firms who interact with foreign engineers, 17% introduced new products based on new technologies in the 2011–2012 period. In contrast, among the firms who did not interact with foreign engineers, 10% of the firms introduced new products.

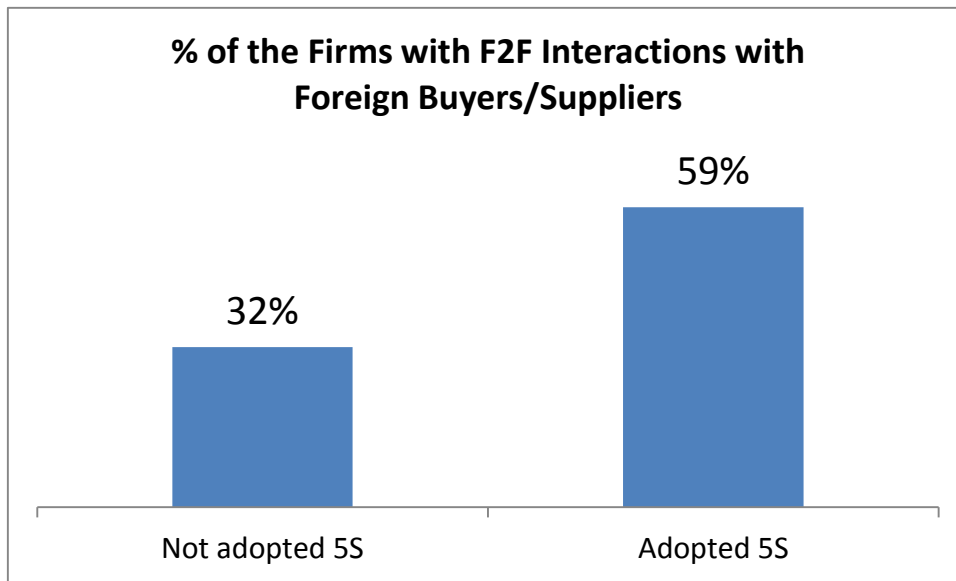
Figure 2 demonstrates the significant relation between face-to-face interactions with foreign business partners and the adoption of 5S. Among the firms who adopted 5S, 59% had face-to-face interactions with engineers from their partner firms operating in foreign countries. In contrast, among the firms who did not adopt 5S, only 32% interacted with their foreign partner engineers (including buyers and suppliers).

**Figure 1: Buyer–Supplier F2F Interactions and Industrial Upgrading**



Source: ERIA Survey FY2012.

**Figure 2: Adoption of 5S and Buyer–Supplier F2F Interactions**

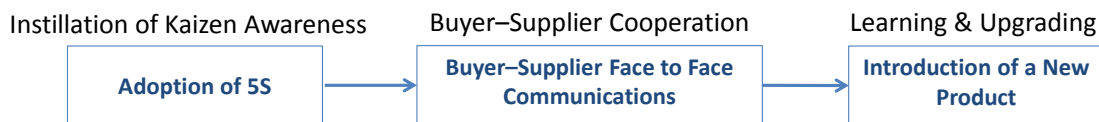


Source: ERIA Survey FY2012.

### 3. CHALLENGES IN DEVELOPING LAO BUSINESSES

Figure 3 summarizes the findings from the previous section. Firms can introduce new products based on new technologies by combining internally and externally available knowledge obtained through buyers and suppliers in the international production networks. External knowledge can be effectively transferred through face-to-face interactions among engineers in their buyer–supplier relationships. Firms in Lao PDR who could build such collaborative buyer–supplier relationships practice quality control methods like 5S.

**Figure 3: A Pathway toward Industrial Upgrading**



Source: Author.

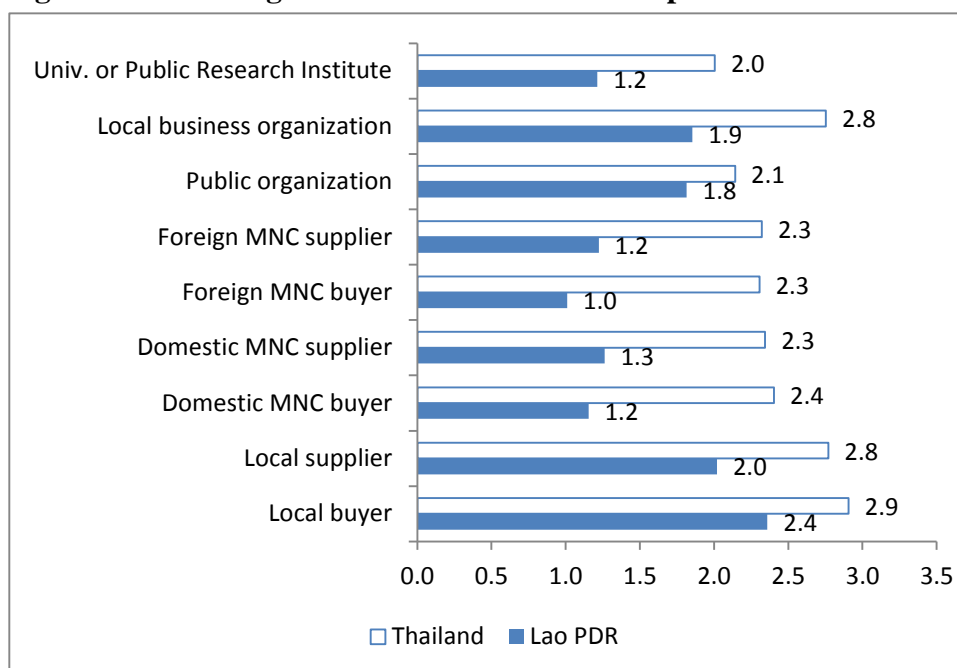
These findings also imply the formation of a relation with the introduction of a new product and the adoption of 5S. The dataset shows that among the firms who practice 5S, 20% introduced a new product; whereas, among the firms who did not implement 5S, 10% introduced a new product. This relation is counterintuitive because 5S is not necessarily a means to invent new technologies and engineering techniques that are applicable to product and process development.

This evidence can be interpreted as follows. Technology transfers from buyers and suppliers are instrumental when upgrading businesses. Firms capable of implementing rigorous quality control management based on the 5S approach can expect to receive technical assistance from their buyers because the buyers in turn expect their suppliers to learn from them and improve the products and services that are inputs for the buyers. Such firms are also more likely to need quality inputs and services from their suppliers, which motivate them to cooperate with their suppliers.

Although firms can expect a positive effect from 5S and their resulting collaborations with both buyers and suppliers, gaps exist in the diffusion of 5S between locally owned and foreign-owned firms. The survey data reveals that 24% of firms have adopted the 5S approach, but foreign firms (29%) are somewhat more likely to practice this approach than local firms (20%) in Lao PDR. More importantly, the gap in the adoption rate of 5S may be the result of the significantly large gap between local and foreign firms in Lao PDR in their respective probabilities of receiving new and upgraded technologies from their foreign partners. The survey data also shows that although 38% of the total number of respondents have face-to-face interactions with their foreign partners, foreign firms (56%) are considerably more likely to interact face-to-face with their foreign partners than local firms (22%).

Figure 4 provides similar evidence of the limited transfer of technological information between the MNEs and Lao firms in comparison with that between the MNEs and Thai firms. Therefore, the government should provide Lao firms with technical assistance for adopting 5S and other basic quality control methods to facilitate the creation of linkages between MNEs and Lao firms. Business associations, universities, and public research institutes should take a leading role. However, as Figure 4 shows, these institutions are not recognized by Lao firms as sources of technological information in comparison with Thai firms. The relatively minor importance of these institutions may reflect the fact that Lao firms are not aware of the importance of quality and technological upgrading, or that these institutions are not capable of providing satisfactory services to local firms.

**Figure 4: Technological Information Sources Important for Local Firms**



*Notes:* 5-point Likert scale (0 = “Not practicing”, 4 = “Very Important”)

*Source:* ERIA Survey FY2012.

#### 4. POLICY RECOMMENDATIONS

Globalization and East Asian economic integration initiatives will increase the opportunities for firms in Lao PDR to conduct business with new buyers and suppliers. In particular, the ASEAN integration initiative aims at developing a single production base that can facilitate factor mobility and narrow the development gaps in the region (Kimura, 2013). Such expectations are supported by empirical evidence that the movement of engineers promotes interactions among firms and technology transfers to Lao PDR (Norasingh, Machikita, and Ueki, 2015). Nevertheless, firms in Lao PDR need to make continuous improvements (i.e., Kaizen) to realize the potential benefits. In other words, firms need to invest in expanding their learning capabilities to assimilate external knowledge.

The implementation of 5S, which is the basic technique in Japanese TQM that forms the focus of this study, does not require huge capital investments; thus, local firms can employ the 5S approach at an affordable cost. In contrast, the 5S approach is meant to change the organizational culture, which signifies that it will be a very difficult challenge for firms because such a change requires time and perseverance (Ueki, 2014).

Recognizing the difficulty in understanding the nature of 5S and adopting the 5S approach, this study emphasizes the importance of enhancing the awareness of Kaizen among the Lao firms and people. This is because new firms in Lao PDR may have to employ farmers without any work experience in modern industries and train them to become factory workers. Lao PDR can learn from the experience of Japanese factories in Cambodia where workers are recruited from the agricultural communities and taught basic arithmetic, reading and writing skills in their local languages, as well as the benefits of teamwork. 5S may be an appropriate approach to instill the discipline necessary for farmers to become factory workers. Lao PDR should provide monetary incentives to encourage local entrepreneurs to invest in improving the quality of their products and services.

Lao PDR needs to formulate an industrial development strategy that complements East Asian economic integration initiatives. Industrial policies can be effectively implemented when there is public and private cooperation. However, considering the limited capability of public institutions, Lao PDR may have no choice rather than depending on international cooperation at least in the short term. Japanese governmental institutions have experience in assisting other institutions in developing countries (including Thailand) to develop local businesses. Through its long-standing and close ties with Japanese public and private organizations, Thailand has developed institutions capable of providing technical assistance suitable to its local businesses. The idea of Thailand plus One corporate strategy can be incorporated into technical assistance to Lao public and private organizations. Japanese and Thai organizations may be able to cooperate and support industrial development in Lao PDR in a cost-efficient and effective manner.

To sum up the evidence and discussion in this study, the following policy recommendations to the government of Lao PDR can be drawn up:

- 1) An international movement of engineers should be facilitated to promote technology transfers from abroad through effective face-to-face interactions.
- 2) An awareness of Kaizen should be instilled in the Lao business community. The promotion of 5S and other quality control approaches to increase technology transfer opportunities through international buyer–supplier relationships is recommended.
- 3) Capacity building of Lao institutions may be needed to provide effective technical assistance to Lao firms.
- 4) The “Thailand plus one” technical assistance strategy (i.e., Japan’s technical assistance to Lao PDR organizations through its Thai organizations) should be



considered when Lao institutions do not have sufficient capabilities and experience of internationally acceptable quality management.

A policy issue that this study does not focus on but is worth mentioning is the necessity of international cooperation for business matching opportunities along with capacity building efforts to realize international technology transfers through buyer–supplier relationships.

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