Developing Logistics Cluster Sectors for the Indo-China Intersection Logistics Center: Case Study of Phitsanulok Province

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Abstract
The Asian Development Bank (ADB) had an initiative to determine a regional plan of developing North-South economics corridor and East-West economics corridor in Indo-China region. Such development addresses a multi-sectoral perspective, spatial development options, and practical infrastructure, human resource, policy, regulatory and institutional barriers to trade, investment, and the movement of goods and people. Considering an intersection of both corridors, Phitsanulok province is located right at the section and has become a logistics center of Indo-China intersection. Phitsanulok is one of the Northern provinces that has sufficient infrastructure and transportation network, covering road, rail, air, water, and pipe transportation modes. It is therefore appropriate for Phitsanulok to be logistics cluster sector of Indo-China intersection in the future that may serve trade/commodity flow among Greater Mekong Sub-region countries. This study is aimed at 1) analyzing how feasible the logistics cluster sector can be located at Phitsanulok province and 2) reviewing a plan covering the linkage among the four phases of the Phitsanulok logistics center (DC, multimodal transport, ICD, and finally logistics cluster sectors.

Keywords: Logistics Cluster Sectors, Logistics Center, Phitsanulok, Indo-China.

1. Introduction
Thailand has played a key role and is aimed at becoming the hub of transportation in the Greater Mekong Sub-region (GMS) by 2006. In order to accomplish this ultimate goal, logistics is being employed as a strategic plan to gain a competitive business advantage. The concept of logistics will put Thailand in the position of becoming a transportation hub and a distribution center in the GMS. Thailand could subsequently compete with global competitors through a reduction of logistics costs. The logistics costs for Thailand are presently around 23% of Gross Domestic Product (GDP), whereas the logistics costs for the US and Japan are approximately 6% of GDP. This policy allows public and private sectors to become more enthusiastic in conceiving a concept of logistics. Examples of public sectors being interested in logistics include: Ministry of Transport, Ministry of Commerce, and Ministry of Industry. In addition, the Office of the National Economic and Social Development Board conducted a study of logistics and supply chain management and established a steering committee in cooperation with private organizations such as the Thai National Shippers’ Council, the Thai Chamber of Commerce, and the Federation of Thai Industries. Nowadays, every organization pays close attention to the concept of logistics and supply chain management. Individual organizations have integrated the concept of logistics into their strategic planning and company objectives.

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Fig. 1 Greater mekong sub-region.

In considering the cluster of both Phitsanulok and nearby provinces in becoming logistics centers in Indo-China, the team project 1) gathered data from several public and private organizations, 2) interviewed organizations involved, 3) formulated focus groups with entrepreneurships in nearby areas, and 4) conducted surveys by using questionnaires. Afterward, the project team took the collected data for further analysis and drew a reasonable conclusion, as well as proposed a development plan that is illustrated in the following phases:
- Phase 1 (2005 and beyond), establishing the distribution center (DC)
- Phase 2 (2007 – 2017), developing multimodal transportation continued from establishing the DC
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- Phase 3 (2012 – 2017), developing an inland container depot (ICD) continued from establishing the DC
- Phase 4 (2015 – 2022), developing logistics cluster sector (LCS)

Due to the fact that there have been several research conducted to investigate the first, second, and third phase of Phitsanulok becoming the DC, multimodal transportation, ICD (Laptaned, 2007), respectively. This research has previously investigated the feasibility study of Phitsanulok becoming a developed DC, multimodal transportation, and ICD. Therefore, the final phase of a developed LCS for the Indo-China Intersection Logistics Center will be investigated here in this research study.

2. Review of Literature

2.1 Definition of LCSs

A definition of cluster is “a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of a cluster can range from a single city or state to a country or even a network of neighboring countries” (Porter, 1998, p. 199).

Therefore, the Logistics Cluster is the official cluster of the logistics sector (conveyors, logisticsian, managers of infrastructures and the training organizations) in any industrial sectors. The goal of the cluster is to contribute to the development of the sector of logistics.

2.2 Literature Survey

Lee and Oum (2001) proposed the strategies for making Korea a Northeast Asian Logistics/Distribution Hub country. After summarizing the recent trends of multinational firms’ logistics and distribution practices and the conditions of successful logistics hubs, we identified the potential advantages of Korea over Japan and China, and examined the success cases of the Netherlands and Singapore. This allowed us to make a number of suggestions to help make Korea attractive to foreign multinationals as the place to locate their northeast Asian regional distribution centers.

Chin and Tongzon (2001) studied transportation Infrastructure Management for Attracting Global and Regional Distribution Centers in Singapore. The success of Singapore as a major transshipment hub must due to the presence of a worldclass transportation system with worldclass players such as SIA and PSA capitalizing on Singapore’s comparative advantage in location, which began with the development of the port followed by air and land. The land, sea and air sectors have taken an independent approach to development and investment in the past. Multi-modalism in the cargo industry demands instant acquisition, processing and analysis of data, thereby logistics is that vital link to enhancing production, distribution and consumption.

Bremer Institut für Produktion und Logistik GmbH (2007) conducted research on the projects in the Enterprise Logistics Cluster that aim to develop and demonstrate advanced IT solutions for the design, management and control of enterprise logistics chains. It took into consideration both intra- and inter-enterprise logistics chains.

The Enterprise Logistics Cluster relates to the domain 8 R&D areas of the ESPRIT Work Programme: Management Tools for the Virtual Enterprise and Intelligent Production Systems and Equipment. The activities of the Working Group may be summarized in enhancing logistic RTD results of the Enterprise logistics cluster, to provide a dissemination and exploitation framework for those logistics RTD-projects and topics as a knowledge pool for European industry. To increase logistic perception and implementation, logistic minded bodies for systems uptake are identified and collaborations are carried out.

The Singapore Economic Development Board (2001) stated that a robust Logistics & Transport cluster will strengthen Singapore’s capabilities as a compelling hub in Asia for business and investment. It was aimed at developing Singapore into an integrated and connected Logistics & Transport hub that enables the effective flow of goods, information, finances and people. Singapore continued to broaden and deepen the scope of activities of the cluster for growth in areas such as aviation services, oil and gas exploration and production, distributed power, automotive electronics, and SCM. Through strengthening manpower capabilities and infrastructure, it was also aimed at developing Singapore into a choice location for the entire value chain of Logistics & Transport activities including R&D, testbedding, manufacturing, after-market services and HQ centres.

The above literatures related to LCS and logistics center are used as a reference to indicate the potentiality of successful logistics hubs in which Thailand is finally aimed at becoming the logistics hubs in Indo-China. Therefore, the logistics center located in Korea and Singapore, or the LCS located in Germany and Singapore may be exemplary for Phitsanulok becoming the LCS of Indo-China Intersection.

3. Concepts of LCSs

3.1 Functions

LCSs are an association of companies and 3 institutions: freight forwarding and shipping agencies, port services, ecological and university research institution. LCSs may include transportation-logistics service suppliers assemble joint educational programs, market presentations, equipment acquisition and complete service developments.

3.2 Operations

Logistics cluster operations vary in scale from information sharing/coordination (such as infrastructure assessment, port & corridor coordination, transporters & rates, customs, equipment supplier information) to those involving information sharing and common air, ocean and overland transport, storage etc. Regular coordination meetings will be established involving all stakeholder (UN agencies, Government, International and local NGOs).

All organizations have supply chains of varying degrees, depending upon the size of the organization and the type of product manufactured. These networks obtain supplies and components, change these materials into finished products and then distribute them to the customer.
At LCSs, Supply chain is organized through transporters, transport organizations, warehouses, and financial operators. Integration of SCM philosophy in logistic processes is naturally calling for advanced information system that will connect all companies involved in LCSs, and will serve them appropriate information needed for bidding and from customer aspect allows to electronically order logistic services.

### 3.10 Tariff

Tariff structure and costing should be worked out along with the feasibility study and information provided with the application.

### 3.11 General

The main function of an ICD being receipt, dispatch and clearance of containerized cargo, the need for an up-to-date inventory control and tracking system to locate containers / cargo is paramount. Each functional unit of the facility (e.g., siding, container yard gate, stuffing/destuffing area, etc.) should have up-to-date and where possible on-line, real time information about all the containers, etc., to meet the requirements of customers, administration, railways etc. As far as possible, these operations shall be through electronic mode.

### 4. Development of the Logistics Cluster Sectors in Phitsanulok

According to Lat-Krabang ICD, a study conducted by Brinckerhoff (1998) as cited in [9] addressed the issues of intermodal capacity on rail in Thailand in general, and the limitations on the rail facilities at LICD in particular. It was resulted from capacity constraints both in the terminal and on the rail access that became apparent.

The Phitsanulok Inland Container Depot (PICD) which will be Thailand's third purpose-built ICD will originally designed for an effective annual capacity of approximately 500,000 TEU, based on the traffic patterns and growth rates. It is hypothesized that SRT will be able to manage to capture up to 50% of the container, and up to 50% of the container haulage between Laem Chabang and PICD in a competitive market. This research study provides recommendations described as follows:

1) There is a clear need for additional ICD facilities in Thailand, with strong demand in the Northern region, adjacent to the existing PICD site.
2) The site at Khonkaen should be expanded in preference to constructing a new ICD at Phitsanulok because of higher rate of return both financially and economically, including lower construction cost.
3) As financial rate of return is unlikely to be attractive to the private sector, therefore, the Government is likely to provide most of the funding for the project through SRT.
4) The cost estimates based on the use of RC for the track railhead and CY operating areas is approximately 5,000 million Baht (including land acquisition cost). SRT report of study would be required for a review by MOTC prior to further submit to the Cabinet for implementation approval.

### 5. Environment Analysis

A business environment analysis determining the ICD of Phitsanulok province may be analyzing by External Environment and Five Forces Competitive analysis. SWOT analysis will be also determined described as follows:
5.1 External Environment Analysis

5.1.1 Economy

Phitsanulok Municipality is located at the center of lower Northern Region of Thailand along the Nan River, which is approximately 400 Km from Bangkok and 300 Km from Chiang Mai. Phitsanulok has been developed as a transport hub of the lower northern region by rail, highway and air transport. Phitsanulok has about 90,300 of population in 18.27 Km2 of administrative area. The surrounding Tambons (districts) have about 92,600 of the total population [11].

Municipality has been increased with the annual growth rate of 0.8 % during the past 5 years, while the surrounding Tambons records a rapid population growth with the annual growth rate of 2.8 % during the same period. Phitsanulok is fully urbanized and recent urbanization extends to the surrounding Tambons. Phitsanulok’s economy is mainly based on services, trade, tourism, education and administration as a center of the Lower Northern Region. A few industries, large military base and university are located in the surrounding Tambons. Major agricultural products in the surrounding Tambons are rice and corn [11].

5.1.2 Politics

Phitsanulok is one of the provinces in Thailand that has a CEO (Chief Executive Officer) Governor managing the province with democracy. Phitsanulok has own provincial administration organization, regulation, and law, etc.

5.1.3 Transportation

Phitsanulok is a good starting point for a visit to the World Heritage site at nearby Sukhothai. The city can be reached by both rail and air, and is on the intersection of several major highways: Highway No.11 (Sing Buri - Lampang - Chiang Mai), Highway No. 12 (Tak - Lom Sak - Khon Kaen) and Highway No. 117 (Nakhon Sawan - Phitsanulok). Phitsanulok is home to Naresuan University, and Rajabhat Pibulsongkram University, as well as to a major Royal Thai Army base [11].

5.1.4 Social

The basis of the Phitsanulok customs and traditions lies in the family, whose structure is of bilateral descent. Like the Chinese and some other Asian peoples, the young are taught to pay respect to and follow the admonitions of parents, elders, teachers and Buddhist monks who, in the old days, formed a highly educated class.

The wat or Buddhist temple and monastery combined became the centre of the village such as Wat Prasri. It was the place where people attended rites and ceremonies, and observed feasts and festivals all the year round. Nowadays, due to the rapid advancement of technology, the traditional Thai way of living, especially in the big cities, has inevitably changed. However, it is still preserved to a large extent in the faraway rural areas where modern civilization has failed to penetrate [11].

5.1.5 International

Phitsanulok is located at the intersection between the GMS (Greater Mekong Sub-Region) North-South and East-West Economic Corridors. Both corridors are one of GMS programs, and had been endorsed for implementation by the GMS ministers which are described as follows:

The GMS North-South Economic Corridor (NSEC) is one of the 11 GMS flagship programs and was endorsed for implementation by the GMS ministers at the 11th GMS Ministerial Conference in Phnom Penh, Cambodia in November 2002. The Chiang Rai-Kunming via Lao PDR Road Improvement Project is one of the key subprojects under the NSEC. Currently, ferryboat service across the Mekong River is the only means of cross-border transport between Houayxay (Lao PDR) and Chiang Khong (Thailand) along this road. According to the pref feasibility study for the NSEC, there would be a considerable bottleneck along the corridor if a bridge across the Mekong at the said border crossing point is not constructed. Moreover, such a bridge will: facilitate trade between Yunnan Province of PRC, Lao PDR and Thailand, reduce transport costs in the Corridor, and increase the efficiency of moving goods and passengers [1].

The East-West Economic Corridor (EWEC) was endorsed by the 10th GMS Ministerial Conference in Yangon, Myanmar in November 2001. It encompasses a road link about 1,450 km long. When the undeveloped or missing sections are in place, it will be the only direct, continuous land route between the Indian Ocean (Andaman Sea) and the South China Sea. Completion of the Corridor will provide the basis for accelerating east-west economic cooperation and development. The corridor will link the following points: (i) Mawlamyine-Myawaddy in Myanmar; (ii) Mae Sot-Phitsanulok-Khon Kaen-Kalasin-Mukdahan in Thailand; (iii) Savannakhet-Dansavanh in Lao PDR; and (iv) Lao Bao-Hue-Dong Ha-Da Nang in Viet Nam. The Corridor intersects several north-south arterial routes: (i) Yangon-Dawei, (ii) Chiang Mai-Bangkok, (iii) Nong Khai-Bangkok, (iv) Route 13, in Lao PDR, and (v) Highway 1A, in Viet Nam. The EWEC will therefore play a critical role in providing access to ports for northeast Thailand and Central Lao PDR, as well as open greater opportunities to several medium-sized cities in the four GMS countries [1].

5.2 Five Forces Competitive Analysis

An analysis of industrial competitive condition will be done by using the Five Forces Competitive model. This model is a framework that describes how an industry grows, behaves and responds to five primary "external" and "internal" forces. The Porter 5 forces model is a framework for understanding the underlying structure of an industry or business segment, built around the five primary and dominating competitive forces that affect the short, intermediate and long-term effects of an industry's size, strength, vitality, and profitability. The value of the 5 Forces model and subsequent analyses is to help understand and predict the behavior of the industry, and most importantly, the actions of rival companies.

5.2.1 Threat of new entrants

Phitsanulok is located at the intersection of Indo-China and can be accessed with different modes of transportation (i.e., road, rail, and air) from all regions. It has been proposed to accommodate with the master plan developed by the NESDB. Therefore, new entrants like Phitsanulok to start the LCS to compete with other provinces such Chiangmai,
Khonkaen, etc. can be done by developing the first stage with a few numbers of logistics cluster such as fruits, vegetables, rice, dairy products, etc.

5.2.2 Bargaining power of suppliers

From the Phitsanulok's economic condition standpoint, investment is made by small and medium enterprises and agricultural sector. Most of the products sold are likely to be agricultural product or one tambol one product (OTOP). Those entrepreneurs may not have own warehouses and distribution channel, therefore a cost product becomes lofty. Therefore, Phitsanulok may need to promote how its LCS could support the SMEs' operations in cost reduction.

5.2.3 Bargaining power of buyers

A cost induced in wholesale and retail is currently high due to the lengthy distance between a factory and a retail outlet. If the LCS where can serve transportation service using road or rail transportation taken place, then those wholesale and retail will gain benefits from using the service. Therefore, there will be no bargaining power from LCS customers.

5.2.4 Threat of substitute products

Phitsanulok or other provinces in the northern part of Thailand has not yet developed LCS to serve customers in this region, thereby a development of PLCS will provide opportunity for manufactures to enable effective transportation of products.

5.2.5 Rivalry among competing firms

LCSs have been planned to develop in different parts of Thailand such as Chiangmai, Khonkaen, etc. Individual province governed by CEO governors has engaged the consultant to conduct the feasibility study to assist in determining for LCS development. Therefore, if such LCSs took place in the near future, they would be a major rivalry to PLCS.

6. SWOT Analysis

6.1 Strengths

The PICD project may be developed and located nearby Bueng-Pra district that includes Bueng-Pra rail station and Phitsanulok Domestic Airport. By located in this area, this project could be integrated into Phase 2 - multimodal transportation which will be located in Bueng-Pra district as well. More importantly, PICD will be the Indo-China ICD linking Danang seaport, Vietnam, Laem-Chabang seaport, Thailand, and Moa-Lamaeng, Myanmar. This ICD may use both rail and road transportation by using existing railway among the GMS and roadway along the North-South and East-West Economics Corridors which could transport products among the GMS with lower cost, less time, and one-stop service including custom procedure. Developing PICD would increase the potentiality of logistical system in Thai industrial and service sectors. This would provide a credit for foreign investors to invest money in Thailand in the future that may support a policy of Thailand becoming a logistics hub in South-East Asia.

6.2 Weaknesses

Due to this project may lack of support from industrial and governmental sectors causing from high investment. Therefore, there should be a feasibility study conducted to evaluate an actual demand and market segmentation including the potentiality and capability of entrepreneurs fulfilling customer requirements. Moreover, a clarification of policy planning in developing transportation network or multimodal transport linking different modes of transportation such as rail, road, sea, air, and pipeline. If this issue had not been planned properly, it could have responded to an end customer efficiently. It is therefore for the Phitsanulok’s governor to systematically plan for the objective to be fulfilled according to its strategic policy. Additionally, the railway built from Phitsanulok province to a central part of Thailand is still a meter gauge (1 meter), and some part of the railway extending from Makkasan, Bangkok to Cha-Cheong-Sao is found to have a double-tracking system. From this point to Laem-Chabang seaport have not been fully developed for double-tracking. These matters would become weaknesses unless Thai government plans to develop a standard gauge (1.435 meter) and extend the railway to double-tracking.

6.3 Opportunities

The PICD project is one of the most interesting projects to have handling/temporary storage of import/export laden and empty shipping containers on land linking to three different seaports among the GMS. This may increase business competitive advantage by using railway or roadway that could save cost and time. According to the Industrial Estate Authority of Thailand, there have been a number of factories increasing in the past few years with a support from Thai government. This may increase export and import of raw materials from overseas, resulting in an increasing volume of transportation.

The National Economic and Social Development Board (NESDB), Thailand found that logistics cost was 16.8 % in 2005 due to its transportation system mostly appears to be road transport (88%). Only 2% was a percentage of rail transport being utilized. According to the Logistics Master Plan developed by the NESDB, a Hub and Spokes system has been introduced to promote ICD/CY, CY road-link, location planning, and port-related business project development. Furthermore, the NESDB plans strategically to develop Phitsanulok province to become the logistics center of Indo-China intersection in the future that may serve trade/commodity flow among Greater Mekong Sub-region countries. Therefore, Phitsanulok is chosen to be one of the potential provinces in Thailand to sustain Thai economy due to its geographical location.

6.4 Threats

The Lat-Krabang rail terminal that will be expanded from the existing facility has been officially approved by Thai cabinet. A development of detailed plans for SRT to implement the ICD is underway. Additionally, a governor of Khon-Kaen province engaged the consultant to conduct the feasibility study to assist in determining for ICD development. Thirdly, Nakom-Sawan is also aimed at becoming ICD to transport rice that is thought to be a main product of its province sold to overseas or used for domestic consumption. Therefore, the above future ICDs would be a major competitor to PICD.

7. Conclusion and Recommendation

In summary, Phitsanulok province is thought to be more
appropriate in becoming ICD in Indo-China. It also has an excellence infrastructure as well as is located at the intersection between the North-South and East-West Economic Corridors (Indo-China Intersection). According to the Logistics Master Plan developed by the Office of National Economic and Social Development Plan, Phitsanulok has been selected to be a Logistics Center of Indo-China Intersection. Therefore, this study reviewed the literature and identified how the ICD can be developed in parallel to External Environment, Five Forces Competitive analysis, and SWOT analysis. It was concluded that developing PICD would increase the potentiality of logistical system in Thai industrial and service sectors. This would provide a credit for foreign investors to invest money in Thailand in the future that may support a policy of Thailand becoming a logistics hub in South-East Asia.

References


