Research Article

Production Linkages between Thailand and Mainland ASEAN Nations

Kriengkrai Techakanont*

Yoshi Takahashi**

Abstract

This research investigates the production linkages between Thailand and mainland ASEAN countries. in the case of Thailand, accelerating productivity growth and skills development are critical in addressing the challenges arising from labor shortages and skills mismatch. Findings from in-depth interviews indicate that Thai industry has gradually lost its competitiveness. Based on three case studies involving autoparts (wire harnesses), electronics products (digital cameras) and garments (lingerie), Thai operations have accumulated experience in production and become involved in higher levels of technology, such as process and product engineering. The case studies under consideration revealed evidence of the role of Thai companies in transferring standardized technology to neighbouring countries having relocatedelements of their production away from Thailand. The relocation of manufacturing to neighbouring countries will continue, but the locations involved will become nearerto the borders of Thailand where road transportation networks are more accessible. The ASEAN highway network, especially the East–West andSouthern Economic Corridors, may shape anew patterns of trade and investment. Thailand has gradually increased its role in providing technical support to overseas plants operating in mainland ASEAN nations.

Keyword: Production linkages, product cycle, supply chain management, technology transfer, Thailand

---

* Faculty of Economics, Thammasat University, 2 Prachan Rd., Bangkok, 10200, Thailand
Corresponding author's email: (krieng@econ.tu.ac.th)

The author would like to thank the Faculty of Economics, Thammasat University for research support during my sabbatical leave in academic year 2015. Financial support from the Sumitomo Foundation, Fiscal 2014 Grant for Japan-Related Research Projects was also highly appreciated.

** Graduate School of International Development and Cooperation, Hiroshima University, Japan

1. Introduction and background

The origin of ASEAN was primarily predicated on political and security considerations. However, an economic development agenda hasoccupied an increasingly fundamental role since the First ASEAN Summit of 1976. Since then, member of the ASEAN community have achieved different levels of economic development and industrialization. Some have developed to become high-and middle-income countries, such as Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand, while others havejust embarked on thisjourney. New opportunities have opened for all members albeit encompassing differences in economic development and resource endowment. Growth and prosperity has been achieved largely through intensive regional integration.There were sufficiently large resources to share, downstream industries to create, several road networks and infrastructure projects to build, together with both intra-regional and extra-regional demand to satisfy.

As the ASEAN Economic Community (AEC) has become more effective, it is believed that ASEAN State Members need structural adjustments in order to fully benefit from the freer trade conditions, increased investment, and burgeoning labor mobility. However, given the different economic backgrounds, levels of industrial development, and readiness of existing supply chains, adjustments will differ fromindustry to industry, even those operatingwithin the same country. Therefore, the main objective of the paperis toexamine the structural adjustments in the production networks of mainland ASEAN nations, consisting of Cambodia, Laos, Myanmar, Thailand and Viet Nam.

According to development patterns, in the past researchers tended to believe in a step-by-step view of industrialization, in which the sequence of industrial development would proceed from importing commodities, through to domestic production (i.e. import substitution), and then to the export of manufactured goods. This pattern of development was proposedby Akamatsu (1962) and Vernon (1966). Structural transformation and upgrading in capabilities then took place in manufacturing sectors, through backward and forward linkages. However, the development of information and communication technologies and the

proliferation of trade liberalization changes have prompted multinational firms to view their production as constituting a network, rather than representing "stand-alone overseas investment projects" (Ernst and Kim, 2002). Thus, a developing country does not have to proceed through the traditional sequence representing industrial development. Rather, it can bypass such constraints to specialize in a niche segment of the value chain, in which it has a comparative advantage,before progressing onto higher value chain activities.

This paper attempts to address issues related to industrial and structural changes that potentially affect production networks andsupply chainswithin the manufacturing sector in Thailand. Three case studies are involved; 1) autoparts, 2) digital cameras and 3) garments. It is expected that Japanese affiliates in Thailand (as well as Thai firms) need to strengthen linkages within the value chain, resulting in new patterns of technology transfer.

The organization of this report is as follows: after the introduction, in Section 2, we will provide a theoretical and conceptual background. Section 3 explains Thai historical engagement with the ASEAN community and the prevailing labor market situation. Section 4 examines the impact of ASEAN integration on Thai industry, based on three case studies. Section 5 presents the conclusions.

2. Conceptual background

Several past studies illustrated that Japanese FDI has had a profound impact on overall production networks and trade in East Asia.The relocation of manufacturing by FDI from Japan and Asian NIEs has played an important role in productive integration in the region (Athukorala 2008, Kawai and Wignaraja 2007). Production relocation of multinational corporations (MNCs) into Asian countries may explain the intensive agglomeration of manufacturing within ASEAN members. Japanese FDI has been playing a crucial role in both global production sharing (Ng and Yeats 2001, Athukorala and Yamashita 2006) and the skills development of local firms in host economies (Techakanont and Terdudomtham 2004, Yamashita 2008). This evidence suggests that FDI and trade are complementary and developing countries can promote not only industri-

alization, but also production and trade integration.

As trade and investment become more liberalized, there will be ample opportunities for existing players, both MNCs and local firms, to exploit the region's comparative advantages. New investment or the relocation of existing production from a high-cost to low-cost activities is likely to happen. Prevailing-supply chainsor production networks may adjust with differing rates of change, due to the particular nature of each industry and location context.

According to Product Cycle Theory, as outlined by Vernon (1966), latecomers usually enter onto the technology ladder from a standardized or mature industry. They were recipients of the foreign direct investment of firms in developed countries, seeking low production costs and/or to penetrate new markets. Host economies were able learn and assimilate new methods and upgrade their technological capabilities through the combined processes of demonstration, competition, spillover effects and technology transfer, as widely discussed in the relevant literature (Dunning 1983, Borensztein et al 1995, Blomström and Kokko 1998, Markusen and Venables 1999, Moran et al. 2005).

Vernon (1966) questioned where innovation should first take place. In his paper, he espoused developed countries. One main reason he gave concerned saving transportation costs. In his opinion the proximity to suppliers and customers and the form of innovation couldinvolve either product or process innovation, such as labor savings (machines) or high-income products (income elastic goods). This could take place when entrepreneurs realize customers' needs and can apply their technological knowledge to such innovation. Thus, it confirms that the early stages of new production initiative will occur in the home country.

When investing abroad, either through FDI or licensing, firms need to adjust designs or change supply chains in order to align with the prevalent conditionsin host economies. Elasticity of demand is not high, while firms have the necessary market power to set prices. Such activities require intensive communication with suppliers, customers and competitors. Firms may not want to invest abroad during this stage. However, when the product becomes mature and

demand expands, production technology becomes standardized. At this point in the process, costs will be a more crucial factor within competition and the location of production will increasingly matter. Less developed countries may offer a competitive advantage as a production location.

However, the relocation of manufacturing activities to less developed countries usually incurs additional costs. Firstly, the firm must prepare setup costs, such as expenses for obtaining licenses and government permission, costs involved in setting up new factories and production lines and training budgets. Secondly, it may need to bear the search costs required for sourcing materials or suppliers. Lastly, transportation costs may be substantial for shipping raw materials to the new location and finished or semi-finished products back to regional headquarters. In order to benefit from lower labor costs, the investor must weigh the impact of less efficient infrastructure, such as road networks and the longer distances involved, against the higher utilities costs incurred concerning electricity, gas,water, and sewage disposal. These expenses tend to be higher with services lacking reliability in less developed countries.

This paper will focuson the adjustments of Thai manufacturing sectors in response to losses in competitive advantage within some industries due to rising wages in Thailand, togetherwith the role of road networks connecting Thailand and CLMV. It is argued that standardized production technology will be firstly relocated out from Thailand to other locations more suitable in terms of production and market penetration. This is partially similar to the conditions Vernon (1966) described. However, it is different in the sense that Thai organizations are not the innovating firms. They are latecomers that have developed and moved up to a certain level in the global value chain. They understandthe methods of production, some stages of the engineering process, and have been responsible for supplying global markets under Japanese FDI to Thailand. Thus, being comparatively more advanced in manufacturing experience allows certain Thai firms to relocate some constituents of the value chain to other locations, both in Thailand and neighboring countries.

3. Thai engagement with the ASEAN community andthe labor market situation

3.1 Thailand's historical engagement with ASEAN

Continuous cooperation among the ASEAN member states for more than four decades has gradually removed barriers and enhanced common interests, while simultaneously encouraging peace and prosperity for the population involved. ASEAN is now at a crossroads, poised to move towards becoming a single market and production base, which will provide increased opportunities for member states to prosper. Currently, the AEC, a single and common market for ASEAN, has become a reality for its 600 million people. This will lead to the free flow of goods, services, investment capital and skilled labor among the member states. This section elaborates on Thailand's important role in this process.

Thailand's engagement with ASEAN dates back to the establishment of the Association of Southeast Asia (ASA), which was created by Malaysia, Philippines and Thailand in 1961. In August 1967, the leaders of Indonesia, Malaysia, Philippines, Singapore and Thailand discussed and signed a document that came to be known as the ASEAN Declaration.[1] According to the declaration, ASEAN represents "the collective will of the nations of Southeast Asia to bind themselves together in friendship and cooperation and, through joint efforts and sacrifices, secure for their peoples and for posterity the blessings of peace, freedom and prosperity."[2] The bloc grew when Brunei Darussalam became the sixth member in January 1984 and Viet Nam the seventh in July 1995. Two years later, the Lao People's Democratic Republic and Myanmar (Burma) joined, followed by Cambodia in April 1999.

In 1992, ASEAN achieved an important milestone in regional economic integration with a consensus achieved to establish the ASEAN Free Trade Area by 2010. Since then, ASEAN has continuously pursued closer economic cooperation in trade, services and investment and moved towards becoming

[1] The five Foreign Ministers who signed the document were Adam Malik of Indonesia, Narciso R. Ramos of the Philippines, Tun Abdul Razak of Malaysia, S. Rajaratnam of Singapore and Thanat Khoman of Thailand.

[2] See www.asean.org/asean/about-asean/history [31 Oct. 2013].

a single market and production base to increase region al competitiveness. This process has includedinitiatives such as the ASEAN Framework Agreement on Services, which was adopted in 1995 anddesigned to eliminate restrictions on intra-ASEAN trade in services,in addition to the ASEAN Investment Area, which was established in 1998 seeking to liberalize intra-ASEAN investment.

Membership has been a cornerstone of Thai foreign policy, through which the government emphasizes enhanced cooperation within ASEAN frameworks in order to build stronger trust and confidence among all members. Thailand is keen to promote peace, stability and prosperity in the region; it has actively contributed to ASEAN since the early days. Under the Thai chairmanship in 2008–2009, one Ministerial Meeting and two ASEAN Summits (the 14th and 15th ASEAN Summits) were conducted in Thailand. The roadmap for the ASEAN Community had been agreed by the members in the 14th ASEAN Summit.[3] The roadmap lays down a series of measures to direct the community-building efforts across three pillars: 1) the ASEAN Political-Security Community, 2) the ASEAN Economic Community and 3) the ASEAN Socio-Cultural Community.

The AEC Blueprint is designed to help establish ASEAN Member States as a single market and production base. The underlying goal is for the ASEAN region to become more dynamic and competitive. The blueprint will "strengthen the implementation of its existing economic initiatives; accelerating regional integration in the priority sectors; facilitating movement of business persons, skilled labor and talents; and strengthening the institutional mechanisms of ASEAN" (ASEAN Secretariat 2009, p. 21). Additionally, the blueprint aims to address development inequalities, strengthen cooperation and accelerate the integration of "latecomers", especially Cambodia, the Lao People's Democratic Republic, Myanmar and Viet Nam (CLMV economies).

It will incorporate a wider, expanded range of trade-related areas, such as "human resources development

[3] See www.asean.org/news/item/cha-am-hua-hin-declaration-on-the-roadmap-for-the-asean-community-2009-2015 [15 Nov. 2013].

and capacity building; recognition of professional qualifications; closer consultation on macroeconomic and financial policies; trade financing measures; enhanced infrastructure and communications connectivity; development of electronic transactions through e-ASEAN; integrating industries across the region to promote regional sourcing; and enhancing private sector involvement for the building of the AEC" (ASEAN Secretariat, 2009, p. 22).

Thailand proposed the concept of enhanced ASEAN connectivity, comprising physical, institutional and people-to-people connectivity. The implementation of the Master Plan on ASEAN Connectivity is a top priority. When ASEAN becomes one community, enhanced connectivity within and beyond the region is vital. The flow of goods, services and labor will be freer, especially via land links through transportation networks between Thailand and the CLMV economies. The road networks that link Thailand with these four countries include the East-West Economic Corridor, the Central Sub-corridor, the Southern Coastal Sub-corridor and the Southern Economic Corridor. Road networks can enhance both economic development and the productive integration between Thailand and the CLMV economies.

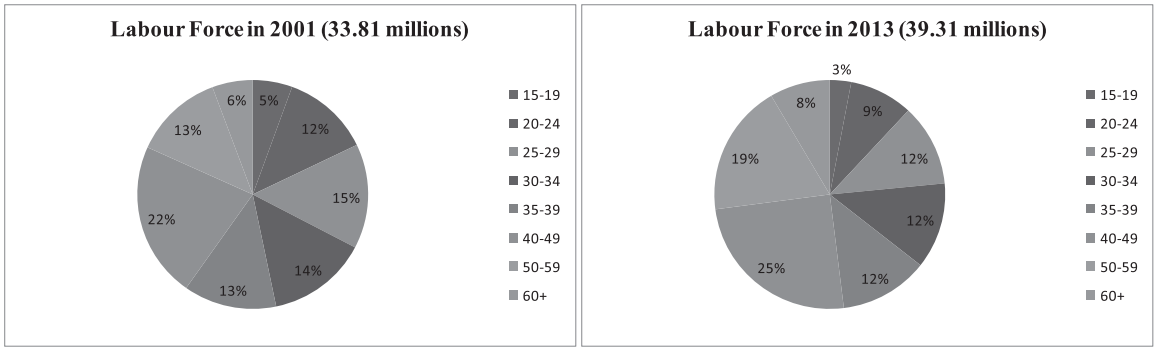
3.2 Labor situation in Thailand

Within Thailand the labor shortage has been alarmingover the past five years. Due to the economy expanding after the financial crisis of 1997, unemployment reduced from 3.3 percent in 2001 to 0.7 percent in 2011. In 2012, Thailand had a total population of 64.45 million, consisting of 31.7 million males, 32.7 million females and a total adult population of 43.2 million.[4] The population growth rate was 0.6 percent. Regarding the labor force, during 2001 and 2012, it increased from 33.81 to 39.31 million, and its structure changed in terms of age and education, as shown in Figure 1 and Figure 2. In 2001, about 59 percent of the labor force was aged below 40, but this figure reduced to 48 percent in 2013. With respect to education level, the structure

[4] This data is derived from the Department of Provincial Administration, Ministry of Interior. online data available at http://service.nso.go.th/nso/thailand/dataFile/01/J01W/J01W/th/0.htm (accessed December 5, 2013).

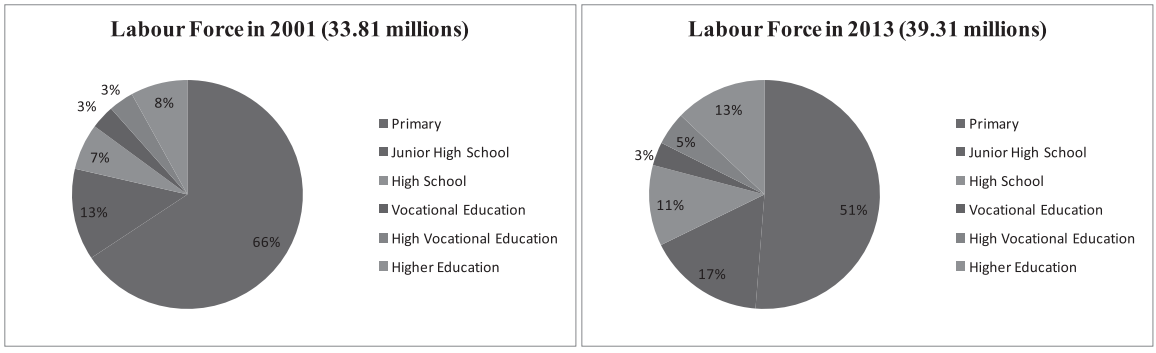
of the labor force also changed. In 2001, about two-thirds of the labor force had completed only primary education or lower and the figure reduced to 51 percent in 2013. This trend will continue and the average age of the Thai labor force will be higher, comprising more workers who have completed higher education. During 2001 and 2013, the elderly population increased from 5.8 to 8.5 million persons, while the elderly labor force increased from two to three million over the same period, see Figure 3.

Figure 1 Thailand's Labor Force, classified by age (unit: thousands)



Source: National Statistical Office, compiled by NESDB online database, accessed October 31, 2013

Figure 2 Thailand's Labor Force 2001 – 2013 (classified by education)



Source: National Statistical Office, compiled by NESDB online database, accessed October 31, 2013

Figure 3 Elderly Labor Force (unit: thousands)

Source: National Statistical Office, compiled by NESDB online database, accessed October 31, 2013

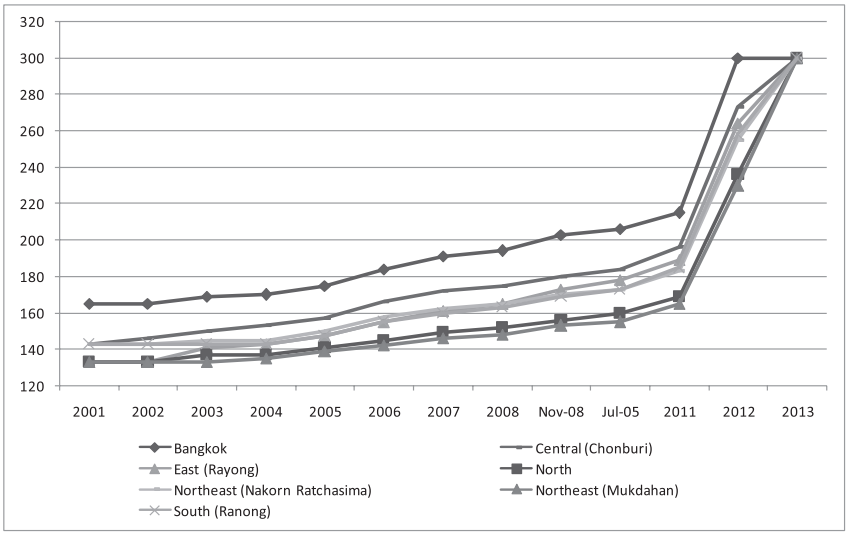
Before 2013, minimum wage rates among provinces and regions were different. The minimum wage rate was highest in Bangkok and vicinities, and lower in the provinces of Central, South, North and Northeast, respectively. As shown in Figure 4, the minimum wage surged in 2012 and levelled out at the same rate in 2013 of 300 baht per day. This represented part of the election campaign run by the Phue Thai party in the election of 2011. The effects of such policy weremarked and widespread. The relative wage rate tended to be lower in the North and Northeast provinces. Minimum wage differentialsexisting among provinces were due to both differences in economic conditions and the cost of living. Comparing minimum wage rates in 2013 with 2011, they increased by 39 percent for Bangkok and vicinities, 53–58 percent for the Eastern Seaboard area, 62 percent in the South, 77 percent in the North, and 63–81 percent for Northeast provinces. Regional development was able to be promoted because firms were willing to

locate far away from Bangkok to access lower labor costs, compensating for the higher transportation expenses incurred in both materials out and finished products to market. However, uniform minimum wage ratesdid also have negative effects on particular aspects of regional development. Some factories were forced to close because they wereunable to afford the high labor and transportation costs incurred.[5]

In order to evaluate competitiveness, we would consider both wage rates and labor productivity. It is clear that the new minimum wage placedconsiderable pressure on manufacturing operations. Labor productivity per hour (year 2001 = 100) on average grew by three percent, during 2001 and 2013. Taking only agriculture and manufacturing for comparison, labor productivity in both sectors was higher than the overall figure and grew at average rates of 3.4 and 4.0 percent, respectively. Taking the average minimum wage rate into consideration, we can see that the wage rate surged in 2011, surpassing the growth of labor productivity, see Figure 5.

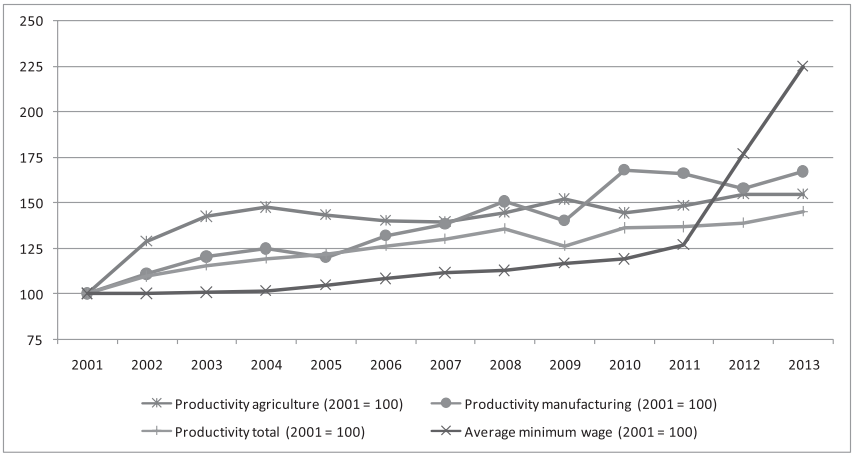
[5] An example is Ecco (Thailand), Co.Ltd., a footwear company, located in Pichit province decided to shut down its operation because of the uniform minimum wage policy. Minimum wage increased by 83 percent, from 163–170 baht per day in 2011 and become 300 baht a day in 2013, the company will shift all production to another plant located in Ayutthaya province, less than 100 kilometers from Bangkok. From the news, the company pay compensation to laid off workers, according to the Thai Labor Law, and will accept workers who want to move to Ayutthaya. (from http://www.manager.co.th/Local/ViewNews.aspx?NewsID=9560000140720, accessed November 30, 2015).

Figure 4 Minimum Wages in 2001-2013



Source: National Statistical Office, compiled by NESDB online database, accessed October 31, 2013

Figure 5 Labor Productivity and Average Minimum Wage (2001 = 100)



Source: Labor productivity data is from Bank of Thailand, www.bot.or.th accessed at December 6, 2013, and average minimum wage rate is calculated from the Ministry of Labor figures, accessed on October 31, 2013.

Note: Labor productivity data taken from Q1 of each year, except Q2/2001. Minimum wage is the average wage rate of all provinces.

With labor shortages in some industries, such as processed food, construction and agriculture, Thailand has become a country of net immigration, including an estimated two million migrant workers from neighboring countries, i.e., Myanmar, Laos, and Cambodia, both registered (legal) and unregistered (illegal). Based on data from the Office of Foreign Workers Administration, the stock of foreign workers totaled about 1.15 million persons in 2012, reduced from 1.7 million in 2011, see Table 1

Table 1 Stock of Foreign Workers in Thailand (2001 – 2012)

	2001	2005	2009	2010	2011	2012
Registered Foreign Workers	**50,844**	**101,111**	**210,745**	**344,686**	**446,785**	**940,531**
- Permanent	14,423	14,423	14,423	14,423	983	983
- Tempory	26,127	65,809	68,399	70,449	73,841	82,833
- Tempory (MOU Import Workers)	0	0	27,447	26,525	69,712	93,265
- Temporary (MOU Nationality Verification)	0	0	77,914	210,044	276,432	733,603
- BOI	10,294	20,879	22,562	23,245	25,817	29,847
Unregistered Foreign Workers	**572,224**	**745,549**	**1,334,157**	**955,595**	**1,272,415**	**219,345**
- Minorities	3,975	40,256	19,775	23,340	24,351	25,732
- Three Nationalities under Cabinet-Council's Conclusion (Cambodia, Laos and Myanmar)	568,249	705,293	1,314,382	932,255	1,248,064	193,613
Total	**623,068**	**846,660**	**1,544,902**	**1,300,281**	**1,719,200**	**1,159,876**

Source: Office of Foreign Workers Administration, Ministry of Labor

Cross-border labor migration is not a new phenomenon, but it has been playing an important role in the Thailand economy since 1980s, especially in sectors which previously recruited relatively few Thai workers, such as construction, fishery, processed food, and garments. Myanmese workers comprise the largest group with many of being unregistered. The registration of foreign workers began in 1992 for Myanmese workers in certain areas. There were policy initiatives between Thailand and neighboring countries to settle a memorandum of understanding (MOU) about cross-border unskilled labor mobility.[6]

As discussed earlier, Thailand has engaged with ASEAN for several decades

[6] Thailand signed MOUs with Laos in 2002, Cambodia in 2003 (Ministry of Labor) and Myanmar in 2003 (Ministry of Foreign Affairs) bilaterally (Kohpaiboon and Kulthanavit 2010).

and has proposed the concept of enhanced ASEAN connectivity in a comprehensive manner. When ASEAN becomes one community, enhanced connectivity within and beyond our region is vital. The flow of goods, services, and labor will be freer, especially via land links through transportation networkswithin Thailand and its CLMV neighbors. The road network that links Thailand with CLMV countries includes the East-West Economic Corridor (EWEC), Central Sub-corridor, Southern Coastal Sub-corridor, and Southern Economic Corridor. An increase in the wage rate has eroded Thailand's competitive advantage, especially in labor-intensive industries. Therefore, it is worth investigating the adjustments made by some industries within Thailand. In this context three case studies will be now discussed.

4. Case studies

Differences in terms of relative stage of development and national resource endowment have opened up opportunities for each country to specialize in some area of production. For instance, amongst Thailand and the CLMV countries, see Table 2, Thailand has the longest history of industrialization and economic development. In particular with respect to the automobile industry, it is likely to maintain its status as a production center for mass production of models for a certain period of time. Indonesia and Malaysia will specialize in other specific models. Nonetheless, CLMV nations have an advantage in terms of cheap labor costs and, given thissome constituents of the value chain may transferred to these countries, in particular, activities within labor-intensive production stages.Some adjustments in production processes and/ or value chains have to be undertaken and in this section three case studies will be presented.

Table 2 Basic information of Thailand and CLMV Countries

	Thai	Cambodia	Laos	Myanmar	Vietnam
1. GDP (billion USD)	377	14.25	9.2	54	138
2. Population (million)	67.4	15.2	6.6	55.1	92.4
3. Population growth rate (percent)	0.52	1.67	1.63	1.05	1.03
4. Labour Force (million)	39.77	7.9	3.69	33.4	49.1
5. Minimum Wage (USD/Month)	220	64.3	78.15	56	112

Source: www.cia.gov and http://www.aseanbriefing.com/news/2013/04/16/minimum-wage-levels-across-asean.html

4.1 Case 1 – Wire Harnesses (Company A)

Company A is a Japanese wire harness producer which has invested in Thailand since the 1960s and which subsequently expanded business activities to include four factories and one office in Thailand. Its main products are wire harnesses for automotives. Its Thai operation supplies parts to almost all carmakers in Thailand. It invested extensively in Asia in order to be able to supply parts to customers in each location. Company A invests in 43 countries, 160 affiliates and 444 locations. The total number of employees, as of June 2013, amounted to 250, 600.

Regarding the labor issue and the approaching AEC in 2015, Company A viewed the minimum wage offset by the Pheu Thai government as a turning point that erodedthe competitiveness of labor-intensive manufacturing industries, such as wire harnesses. However, Company A has always looked for business opportunities in other countries, including CLMV. Although Thailand is a major production hub for wire harnesses in Southeast Asia, Company A has always envisaged an era of increasing wages and costs of production and in anticipation of this has been preparing for establishing operations in other countries since the 1990s.

Possible locations for this include Myanmar, Laos, and Cambodia. Although Company A wants to invest in Myanmar, ongoing political instability has hindered-

such plans. In view of thisitcommitted to invest in Laos and Cambodia instead. The main reason for this was not to utilize cheaper labor costs, but rather to prepare for further relocation if production in Thailand continued to lose competitiveness.

Investment in Laos started 13 years ago. At first, Company A wanted to invest in Sawannakhet because of the completed construction of the Thai-Lao Friendship Bridge, but ultimately decided to establish a joint venture with a Lao company located in Vientiane to produce wire-harnesses. The decision to establish production was not cost-driven as the high transportation costs incurred could not be offset by any gains from cheaper labor costs. Rather, it reflected a company approach to learn about foreign investment to prepare for future expansion in line with their regional and global integration strategy.

This case scenario involving-Company Aacts as a good example of how operations within the labor-intensive production stage may be effectively relocatedto countries with low labor costs. Normally, simple production processes that heavily rely on labor may be relatively easily relocated. Wire harness operations correspond to this category. However, a senior representative of the company, Mr. Uematsu, expressed confidence that Thailand should be able to continue to play the role as Japan over the past 20-30 years in providing technical support to overseas operations. This is due to the manufacturing experience Thailand has accumulatedover the past four decades ofJapanese production systems.

In Vietnam Company A has two plants located in Binh Duong and Haiphong. There is a link between Thailand and Vietnam with respect to the second factory, in which 62.5% of investment equity is from Japan and 37.5% from a Company A affiliate in Thailand. In 2005 there were 2,500 employees and this increased to 5,000 by 2011, whilethe company has received alicense to open a new factory. The organizations main customers are Toyota (exporting to Japan and North America), Nissan (South America and Japan) and Mitsubishi (Japan). It also supplies domestic carmakers, such as Toyota Vietnam, Honda Vietnam and UD Automobile. The majority of sales are derived from exports to its two main customers, Toyota and Nissan in

Japan. Less than five percent of sales were to local assemblers. Therefore, it can be said that the investment strategy of Company Aseeks to utilize Vietnam's comparative advantages, especially in terms of low labor costs, to act as key export bases for many customers in Japan and the US. Most import materials from other plants, especially from Japan, Thailand, and China, and carry out assembly processes in Vietnam.

Considering plants in Vietnam and Thailand, we can see that Thai factories mainly target domestic producers, because of large local demand with an annual production volume of 2.4 million units in 2012. In contrast, Vietnamese automobile production remains relatively small and, hence, it is economical to use its domestic production for export purposes. However, at the moment there is little significant linkage between Vietnamese and Thai plants. As regards potential locations in other CLMV countries, currently Company A has operations in Laos and Cambodia. These locations have potential linkages with Thai operations, due to cheaper laborexpenses and moderate transportation costs.

Potential linkages with CLMV nations are possible for wire harness firms because such manufacturing is labor-intensive and does not require 'strict just-in-time' production line demands on customers.With the existing transportation networks through both EWEC and SEC, possibilities exist to expand production into neighboring countries. The AEC will facilitate cross border trade and the use of road networks could drastically cut shipping times. Shipping by boat from Viet Nam to Bangkok presently takes ten days compared to three days by road transportation, and potentially less than one day from Sawannakhet to Bangkok.

Despite the high labor costs in Thailand, Company A has no plan to use foreign workers from neighboring countries. The basic reason for this is that it will not lower production costs, because Thai minimum wage lawsstill apply. Indeed, with the automotive industry, the wage rate is higher than the minimum wage level. It would be potentially better to locate a plant where the firm could minimize transportation costs, as well as gain access to cheaper local labor. Establishing a Special Economic Zone may constitute a solution in helping

access inexpensive workers. Recently, Company A has made a deal with a local manufacturer in Maesot (the first SEZ in Thailand located at the Thai–Myanmar border in Tak province) to probe such a possibility. Company A provides equipment and trains local staff, while Myanmese laborers are employed to assembly wire harness sets. The wire harnesses produced by this plant are delivered to automakers in Thailand.[7]

In 2015, the Maesot plant employed 400 Myanmese workers and 30 Thai management staff (from supervisors to managers). The plant uses locallabor to support Company Aproduction activities. It receives raw material from Company A's Pitsanulok and Bangkok plants daily. Transportation is undertaken by trucks bringing raw material in and taking final products out to distribution centers designated by Company Aheadquarters. The supply chain in wire harness operations is controlled by the buyer (Company A), which in turn delivers to their customers (car makers). Hence, both the supply chain and production network are managed by Company A headquarters.

In considering future Thai operations,Company Ais confident that their Thai staff isproficient in both manufacturing and management skills. However, a critical deliberation concerning Thai labor going forward lies in 'different culture' management. Company Aintends to use Thailand as a regional headquarters for production operations, controlling satellite production locations that will expand to CLMV countries in the near future. This is known as the "Thailand Plus One" strategy by Japanese autoparts firms. Global sourcing in automobile has now been adopted with suppliers determined at the "product development" stage, which will normally be a global model. If Company A won the order, it would need to supply production locations worldwide. Hence, for customers in Thailand, there is no need to purchaselocally–produced Company Agoods, if theyareuncom–petitive with those produced by other Company A plants.

Based on the current situation, the Thai autoparts industry will lose its comparative advantage in terms of

[7] Based on interviews with Maesot plant representatives on October 7, 2015.

labor-intensive manufacturing. This is not because of the AEC, however. This represents a normal trend in economic development, similar to those experienced in the past by Japan and other developed countries. Company A in Thailand will follow the same path. Currently, the company is trying to move up the ladder to produce higher value-added products, such as combination meters and column switches. Skills development and new investments are necessary to maintain competitiveness.

4.2 Case 2 – Digital Cameras (Company B)

The company was established in 1990 in Bangkok and represents the largest production base for a Japanese digital camera manufacturer outside of Japan. About 95 percent of DSLRs are produced in Thailand. Employment reached its peak in 2005 with 16,000 workers, but the number haddropped to 6,700 by 2015. There are two main reasons for this shrinkage. Firstly, the demand for digital cameras has steadily declined because of the rise of dependence on smart phones. In addition, the flooding disaster of 2011 caused extensive damage of machinery and equipment, leadinghead-quarters to reconsider how to manage production in Thailand.

After recovering from the flood, the company decided to open three new production facilities in areas safe from any future flooding, Saraburi, Singburi, and Nakhon Ratchasima. These three provinces are located near the central Ayutthaya plant so logistical and supply chain management is flexible and reliable. Some suppliers are located in Patumthani, Chonburi and Rayong.

Regarding supply chain manage-ment, in addition to key components imported from Japan, Company B procures parts from Thailand, Cambodia, Laos and Myanmar, whilekey components, such as stators and rotors, are procured in Thailand. The production of some components has been moved to CLMV countries, for examplelenses are produced by a Japanese supplier in Myanmar and sent back to Thailand and Laos for final assembly. Some components are sent for sub-assembly to Cambodia and then delivered back to the Ayutthaya plant for final finishing and reliability testing.

Company Bplans to search for a new location to manufacture various models of digital camerasin which Thai

productionsis no longer competitive, i.e., simple and low value digital cameras. The risein the minimum wage rate to 300 Baht was one of the key factors driving Company B to relocate some operations to neighboring countries. The president of Company B, who had been working in Thailand for ten years) as first a general manager and then president, considered the EWEC linking Thailand with neighboring countries and chose Sawannakhet (Laos) to be the location for Company B's sister plant.

The plant in Laos was established in 2013 with Thai staff playing important roles during the process of setting up production lines. In 2015 number of Laotianemployees reachedabout 1,000 persons working on the production line with approximately 20 Thai staff working in management capacities. One possible advantage of opening in Laos is that there is a very low linguistic barrier Thais and Laotians. From a linguistics viewpoint, the Laotian spoken language is very close to Northeastern Thai dialects. Laotianstend to learn Thai through Thai television programs. Hence, when the factory was established, all training programs by Thai trainers were conducted in Thai. Then, Laotian line leaders who comprehended the production and quality control processes prepared production manuals in Laos. Almost all of the equipmentrequired was transferred from Thai plants, augmented with some new equipment for new production lines. Hence, from a technology transfer point of view, the process took place incorporating both explicit knowledge (transfer of equipment and production manuals drafted in the Laotian language) and tacit knowledge (operational skills and training conducted in the Thai language).

In terms of production linkages, the Laotian plant is assigned to produce models in which Thailand has lost competitiveness. Operations mainly involve assembly stage activities (labor-intensive processes) and some sub-assembly processes. The finished components are then delivered back for final assembly in Thailand. Company B in Thailand is responsible for production planning, part procurement, and export activities. However, based on interviews with Company B representatives, the Laotian plant has the potential to handle the production of new models and will play the same role as the Thai plant has

been occupying for the past 20 years. There is now speculation about the future of Company B operations in Thailand if production activities continue to be increasingly allocated to the Laotian plant.

Tracing the history of Company B over the past two decades, it started operations by mainly focusing on mass production, predominately activities concerned with the labor-intensive production stage of operations. Subsequently, production volume increased until it became one of the largest plants in its field in the world. Hence, the Thai plant has accumulated the skills and technological capabilities required for the mass production of a range of goods from simple film-cameras to advanced single-lens reflex (SLR) cameras. When technology progressed to the digital era, Company B was able to switch produce production to compact digital and digital single-lens reflex (DSLR) cameras. At the same time, it has accumulatedthe experience necessary to become specialized in production planning, for example inprocess engineering and being able to prepareand design new production linesforinnovativeproducts. According to a manager of Company B, the Thai plant is now able to participate in some stages of product development and product engineering with Japanese engineers at companyheadquarters. Hence, the production linkage between Thailand and CLMV in the case of Company B is consistent with product cycle theory and product fragmentation. Production processes that have become less competitive have been moved to other plants, while raw materials are sourced from a variety of locations. With Company B, Thailandhas gradually become a regional headquarters, responsible for managing the supply chain in mainland ASEAN, or Thailand plus CLMV nations.

4.3 Case 3 – Lingerie (Company C)

Company C is a business unit operating under the auspicesof a giant Thai conglomerate, whose products cover food, garments and consumer products. It started producinggarments, i.e., kids wear, casual wears, jackets and other garment products. With respect tolingerie, companymanagement signed a joint venture agreement with a Japanese lingerie producer in 1970 and later established Company C in order to produce lingerie for the domestic market

under its own Thai brand. The Japanese counterpart agreed on this agreement because Company C was able to provide services for its joint venture operations when capacity became overloaded. Technology transfer was provided through both the joint venture operation and to Company C through setting up production lines, installing machinery, providing operation manuals, establishing quality control programs and via training.

Company C expanded steadily so headquarters decided to set up more plants in other provinces. By 2015 the firm had plants in five locations, Bangkok (two factories), Sriracha (1985), Kabinburi (1989), Lamphun (1989), and Maesot (2010). Since the company focuses in lingerie products, in this case attention will be paid to supply chain management andthe division of labor of Company C activities across several plants. However, only Lamphun and Maesot plants are subsidiaries of Company C, while Sriracha and Kabinburi plants are responsible for production supporting the Japanese joint venture.

In terms of product position, this company produces both fashion (high price – low volume) and budget (low price – mass production) lingerie. With fashion lingerie, Company C uses Bangkok factories to handle production. There are two main reasons for this. On the one hand, Bangkok factories have accumulated long experience of producing lingerie. Workers are competent and capable of undertakingthe detailed sewing necessary for fashion lingerie. On the other hand, the volumes concerned are small, so it is important to work closely with marketing and procurement divisions. It should be noted that Company C is only involved in production activities, not in marketing. Companyheadquarters–control marketing channels and require the company to complete stock requirements through electronic purchasing orderson a weekly basis. This program is called the Quick Response Systems (QRS).

The division of labor among the five locations involves Bangkok plants taking care of fashion lingerie and overall production balancing with other plants. Under its own brand, some lines are produced in Bangkok, but most are manufactured in Lamphun and Maesot. The Lumphun plant was established earlier and hence has more experience in operational activities. The two main

factors influencing the decision to relocate to Lamphun in the 1990s involved cheap labor costs and the availability of BOI zoning incentives. In the North of Thailand it was easier to find workers with the prerequisite handicraft skills required for the production of lingerie. In terms of BOI incentives, the industrial park chosen lies in Zone 3, enabling it to receive the highest level of investment incentives.

Interviewswith Lamphun plant executives revealed thatthe operation is located in the group's industrial park, employing 370 workers with a production capacity of 110,000 pieces per month. Interestingly, other garment factories under the umbrellaof the conglomerate owning Company C are also located in the same industrial park. Therefore, logistics can at times be shared among several plants. For lingerie produced at the Lamphun plant, all materials are transported from Bangkok by truck twice a week. The truck departs from the warehouse at 10 pm and arrives at the Lamphun plant at 8 am. Materials are prepared for production the next day. In the evening, the truck will carry products from several plants, including from the Lamphun plant, back to the distribution center in Bangkok, which will finally deliver goods to point of sales destinations throughout the country.

Rising wage ratesand labor shortages in Bangkok and Lamphun during the past decade caused the Company to reconsider the option of relocating its production to neighboring countries. One possible option had been Myanmar. Since the company has no experience in investing abroad, setting up an industrial park in a district of Tak province, Maesot, located adjacent to the Myanmar border was chosen as a better option.Management representatives visited Maesot several times and decided to establish an industrial park in 2007. The industrial park is not only intended for affiliated companies, but is also available to other companies willing to rent the land.

However, at the time of this research only Company C's factories are located in the parkand it is now referred to as the Maesot plant. The advantage of this plant lies in access to cheap foreign labor (Myanmese workers). The establishment of the Maesot plant arose out of production and labor constraints prevalent in Lamphun. Hence, the Maesot plant

plays two important roles for Company C. Firstly, it supports the activities of the Lamphun plant. Secondly, Company C uses the Maesot plant to study the feasibility of future investment in Myanmar as Thailand has experiences rises in wage rates and garment production continues to be labor-intensive. Soon Thailand may potentially lose competitiveness and, thus, stakeholders must be prepared.

The Maesot plant was involved in the production of Japanese brands at first, before later switching to the manufacture of Thai brands. Technology transfer to this plant was expedited by experienced staff from the Lamphun plant. Management staff and supervisors visited the Maesot plantto provide training for the Myanmese workers involved, setting up production lines, together with communicating with Lamphun plant and Company Crepresentatives in Bangkok to facilitate production. Fabrics and other accessories were prepared by Lamphun plant workers and delivered to Maesot once a week. The Maesot plant is then responsible for the assembly of finished products, which are subsequently sent back to Lamphun for preparation and delivery to the distribution center in Bangkok. Hence, the Maesot plant plays a supporting role for that of Lamphun. It should be noted that the equipment at the Maesot plant comprises old machines transferred from both Lamphun and Company C operations in Bangkok, which upgrade their own machine to more contemporary models.

It is interesting to observe that the company has established a subcontracting business with a Myanmese businessman with extensive experience of doing business in Thailand. He met with the top management of the conglomerate overseeing Company C and expressed his willingness to develop operations in his hometown, Pa An. Subsequently, Maesot plant staff have provided technical support to Pa An factorymanagement in terms of setting up operations, designing production lines, installing equipment, preparing production manuals and training local workers. Most of the trainers involved were dispatched from the Maesot plant.

Currently, the Pa An factory employs 60 workers and runs on a subcontracting basis with technical support from the Maesot factory. Regarding logistics, there is a truck once

a week from Maesot to Pa An, carrying the fabrics and accessories for weekly production and delivering finished products back to the Maesot plant. This in turn combinesall the orders received and sendsthem to distribution centers in Bangkok and n Lamphun, depending on particular production planning. At the time of our factory visit in 2015, it was reported that Company C would open a factory in Myanmar in 2016. Key factors for this laynot only in the relatively high wagesto be paid Thailand, but also in the fact that the company intends to further penetrate the Myanmar market.

5. Conclusion

The Thai economy has been growing since the recovery from the Asian financial crisis and the increasingly deeper integration into the global economy. Economic development has been successful in terms of a reduction in the number of people living below the poverty line. Nevertheless, the inequality problem persists, reflected by a wide income gap between the top 20 per cent of the wealthiest households and the bottom 20 per cent. The labor shortage has had an abiding presence, as indicated by the very low unemployment rate and small expansion of the labor force, driving wage rates to increase at a higher rate than productivity. However, the wage increase was in part due to the prevailing government policy. Labor shortages and low productivity may constrain future expansion of the Thai economy. Competitive advantage in labor-intensive activities will soon erode, hence, the economy must be restructured and attempts made to move up to higher value-added production activities.

The establishment of the AEC in 2015 created a single market and production base, opening opportunities for all members. Regional integration in the automobile trade among ASEAN members has been enhanced since the start of the AICO scheme in 1996. Intraregional trade surged tremendously after 2002. Thailand and Indonesia were selected to be primary production and export bases for Japanese carmakers, and each country is now specializing in specific models. This study found that Japanese carmakers have had a leading role in the division of labor within automobile production and regional integration among the ASEAN-5 countries. Combining both production

volume and sales, ASEAN will soon be a major exporter at the global level.

Currently, Thailand is the leading country in terms of production and sales in ASEAN. Accelerating productivity growth and skills development are critical in addressing the challenges fraught by the labor shortage and skills mismatch. The structure of labor demand in the automotive industry will need to change to encompass more semi-skilled and high-skilled labor. Interviews with a variety of actors in this development confirm that the Thai industry has gradually lost its competitiveness. In the three case studies reported in this paper, autoparts (wire harnesses), electronics products (digital cameras) and garments (lingerie), Thai operations have accumulated extensive experience in production and have been able to become involved in higher technology activities, such as process and product engineering, (with the exception ofr lingerie). The case studies confirmedthe role of Thai staff in transferring standardized technology to neighboring countries when parts of the production process are relocatedaway from Thailand. Thailand has gradually increased its role in providing technical support to overseas plants in mainland ASEAN nations.

Although problems arising from labor shortages and high wages persist, relocation to lower labor-cost countries, such as Cambodia, Laos People's Democratic Republic, Myanmar and Viet Nam, is not suitable to organizations in some industries, such as automobiles, due to stringent just-in-time delivery requirements. The employment of foreign workers in simple production operations and labor-intensive activities makes better sense. The relocation of manufacturing to neighboring countries will continue, but the location will be nearer the borders of Thailand where road transportation networks are accessible. The ASEAN highway network, especially the East-West Economic Corridor and the Southern Economic Corridor, may shape anew patterns of trade and investment, which in turn will help integrate the CLMV economies with Thailand.

6. References

Akamatsu, Kaname (1962), "Historical pattern of economic growth in developing countries." The Developing Economies 1: 3–25.

ASEAN Secretariat(2008), "Statement by the Secretary-General of ASEAN welcoming the Kingdom of Cambodia as the tenth member state of ASEAN: 30 April 1999". Available at: www.asean.org/resources/2012-02-10-08-47-56/speeches-statements-of-the-former-secretaries-general-of-asean/8 [28 Aug. 2009].

_____. (2009), Roadmap for an ASEAN Community 2009–2015 (Jakarta). Asian Development Bank Institute (2012),ASEAN 2030: Toward a borderless economic community (Tokyo).

Association of Southeast Asian Nations (2009), Roadmap for an ASEAN community 2009–2015 (Jakarta, ASEAN Secretariat).Available at:www.aseansec.org/wp-content/uploads/2013/07/RoadmapASEANCommunity.pdf [15 Nov. 2013].

Athukorala, P. (2008), "Trade and investment patterns in Asia: Regionalisation or globalisation?" Paper presented at symposium on Micro-Economic Foundations of Economic Policy Performance in Asia, 3–4 April 2008 (New Delhi).

Athukorala, P.; Yamashita, N. (2006), "Product fragmentation and trade integration: East Asia in a global context", inNorth American Journal of Economics and Finance,Vol. 17, No. 3, pp. 233–256.

Blomström, Magnus. and Ari Kokko (1998), 'Multinational Corporations and Spillovers', Journal of Economic Survey, 12, pp. 247–77.

Borensztein, Eduardo et. al. (1995), 'How does Foreign Direct Investment Affect Economic Growth?', Journal of International Economics, 45(1), pp. 115–35.

Dunning, J. H. (1983), "Changes in the Level and Structure of International Production: the Last One Hundred Years" pp. 84–139 in Mark Casson (ed.), The Growth of International Business. London: George Allen & Unwin.

Ernst, D. and Linsu, Kim (2002), "Global Production Network, Knowledge Diffusion, and Local Capability Formation", Research Policy Vol. 31, pp. 1417–1429.

Kawai, M.; Wignaraja, G. (2007), ASEAN+3 or ASEAN+6: Which way forward? ADBI Discussion paper No. 77 (Tokyo, Asian Development Bank Institute). Available atwww.adbi.org/files/dp77.asean.3.asean.6.pdf [30 Nov. 2013].

Kohpaiboon, A; Kulthanavit, P. (2010), Structural adjustment and international migration: Firm survey analysis of Thai clothing industry, Discussion Paper No. 24 (Bangkok, Faculty of economic Thammasat University).

Markusen, J. R. and Anthony J. Venables (1999), 'Foreign Direct Investment as a Catalyst for Industrial Development', European Economic Review, 43, pp. 335–56.

Moran, T., Graham, E., and Blomstrom, M., eds (2005), Does Foreign Direct Investment Promote Development?. Institute for International Economics Center for Global Development: Washington D.C.

Poapongsakorn, N; Techakanont, K. (2008), "The development of automotive industry clusters and production network in Thailand", in Kuroiwa Ikuo and Toh Mun Heng (eds.): Production networks and industrial clusters (Singapore, Institute of Southeast Asian Studies), pp. 196–256.

Techakanont, K. And Terdudomtham, T. (2004), "Historical Development of Supporting Industries: A Perspective from Thailand". Annual Bulletin of the Institute for Industrial Research of Obirin University No. 22, pp. 27–73.

Thailand Automotive Institute (2013), "Moving towards global green automotive industry", presentation at Automotive Summit 2013, 21–22 June (Bangkok).

Thailand Development Research Institute (2012), Designing manufacturing and labor force development strategies for industrial sector demand in 2015(Bangkok, Office of Industrial Economics, Ministry of Industry), unpublished.

Vasuprasat, P. (2010), Agenda for labour migration policy in Thailand: Towards long-term competitiveness (Bangkok, International Labour Organization).

Vernon, Raymond (1966), 'International Investment and International Trade in the Product Cycle', Quarterly Journal of Economics, 80(2), pp. 190–207.