CHAPTER 10

New Division of Labor between Korea and CLMV Countries

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INTRODUCTION

The Mekong River Basin Countries (hereinafter, MRBCs), which include Cambodia, Laos, Myanmar, and Vietnam (CLMV), are once again receiving high attention. This region, which is also called CLMV, excluding Thailand, has been noted as a promising market since the late 1980s due to reforms and system changes. Since the 1990s, the region has become a promising place based on the development of the Mekong River Basin. The reasons for this potential include the fact that the region has clearly established itself as a promising new developing market through quick recovery from the global financial crisis and a sharp increase of foreign direct investment (FDI). Additionally, ASEAN economic integration is underway. While movement toward the 2015 ASEAN Economic Community (AEC) is accelerating, it is thought that the economic growth and industrial development of the CLMV region, which consists of relatively less-developed countries, will determine the speed of the AEC formation. From a broader perspective, East Asian economic integration can also be understood within the same context. Furthermore, Myanmar, which has until now remained under-developed, recently joined the group of promising markets and, thus, CLMV has once again become a subject of interest. In particular, since establishing a new government in April, 2011, Myanmar is quickly becoming more democratized and its economic and legislative sectors are improving rapidly as well.

From Korea's perspective, ASEAN, including CLMV, is one of the most important economic cooperation partners now that it has become Korea's second largest trading partner, third largest destination of overseas direct investment (ODI), largest recipient of official development assistance (ODA), and the second largest area for overseas construction contracts following the Middle East. In particular, ASEAN plays a major role in the East Asian production network, which is gaining in importance. Recently, countries like Vietnam and Indonesia have also become overseas production bases that could offset the growing China risk. It is also important that CLMV possesses great growth potential itself and that it is clearly becoming a new and promising developing market.

From this perspective, the industrial readjustment of CLMV has important implications. Primarily, it is important for the economic development of the countries themselves, but it is also absolutely necessary for the progress of ASEAN integration as well as for the acceleration of East Asian integration. Furthermore, Korea is not only increasing economic cooperation with the growing CLMV market, but has also signed free trade agreements (FTAs) with all ASEAN members. Therefore, Korea is both directly and indirectly related to industrial development in this region.

This study has two goals. The first is to analyze the manufacturing sectors of CLMV countries focusing on structural changes and competitiveness and, based on that analysis, to forecast changes in industrial structure. The second is to interpret the

analysis to provide appropriate policy recommendations for immediate CLMV industrial readjustment in both CLMV and Korea.

This study contains four main chapters. In Chapter 1, Korea's exports, imports, and ODI with the CLMV will be examined using the database of the Korea International Trade Association and the Export-Import Bank of Korea. Chapter 2 examines the structure and competitiveness of the manufacturing industry of CLMV nations. This includes an analysis of manufacturing industry structure by UNIDO INDSTAT 4, while a competitive analysis was accomplished through the Normalized Revealed Comparative Advantage (NRCA), Trade Specialization Index (TSI), and Intra-Industry Trade (IIT) using the UN Comtrade database. The analysis breaks down the manufacturing industries into 24 groups. In Chapter 3, the prospective change of competitiveness in the manufacturing industries of CLMV countries will be examined and, to accomplish this, the NRCA index values of two different periods will be used. In the final chapter, the implications suggested by such analyses as well as policy recommendations for the industrial readjustment of CLMV will be presented.

1. OVERVIEW OF KOREA'S TRADE AND ODI WITH CLMV

Concurrent with the rapid increase of trade volume between Korea and ASEAN, there has also been remarkable growth in trade volume between Korea and CLMV. When examining the progress since 2000, we can see, except during the global financial crisis of 2008-2009, that trade between the two regions has increased rapidly. Among CLMV countries, as of 2010, Vietnam has become Korea's ninth largest export partner and 28th biggest import source. From the CLMV perspective, Korea is an important

trading partner as it is at 10th place in terms of both export and import volume. For Vietnam, Korea is the sixth-largest export destination and fourth-largest import source. In the case of Myanmar, Korea is the seventh-largest export destination and fourth-largest import source. For Laos, Korea is the eighth-largest country that it exports to and fifth largest that it imports from.¹ One noticeable point is the fact that Korea has a trade surplus with all CLMV countries. The biggest reason for this is judged to be that with the increase of Korean investment in this region, all materials in relation to investment were imported from Korea. Another feature is that since the Korea-ASEAN Free Trade Area (KAFTA) trade-in-goods agreement was put into effect in June 2007, trade between the two regions has risen sharply.²

The CLMV region is also growing as an important partner for Korean ODI. In particular, Vietnam has become the fourth largest destination for Korean investment. In addition, Korea's investment in the remaining CLM countries is also gradually expanding. Prior to 2000, Korean investment was concentrated mostly in manufacturing industries such as fibers and sewing work. Recently, however, the emphasis has shifted considerably to the construction and service industries. Despite this, more than half of the total investment in Vietnam, which has become a major overseas production base for Korea, remains in the manufacturing industry. The reason why there is a smaller percentage of investment in the manufacturing industry in CLM countries is because Korea has recently made large-scale investment in this area's energy resources and real estate development sectors.

¹ ADB (August 2011).

 $^{^2}$ Though the KAFTA trade in goods agreement was signed on August 24, 2006, the actual date that it went into effect was June 1, 2007 with Myanmar and Vietnam, October 1, 2008 with Laos and November 1, 2008 with Cambodia.



(Unit: USD in millions)



	Cam	bodia	La	ios	Myanmar		Viet	tnam
	Total Investment	Manufacturi ng	Total Investment	Manufacturi ng	Total Investment	Manufacturi ng	Total Investment	Manufacturi ng
~1999	22,767.2	12,471.7	36,883.1	1,883.5	42,121.4	34,577.9	714,446.2	535,528.4
2000	3,575.8	2,425.3	5.0	0.0	9,138.1	4,111.1	71,264.0	35,680.8
2001	5,566.8	3,768.2	35.0	0.0	5,046.6	4,310.6	58,926.9	41,492.9
2002	4,156.3	1,311.4	50.0	0.0	2,321.7	2,301.7	156,826.9	133,394.8
2003	9,768.6	1,161.1	115.0	0.0	891.1	394.7	163,279.0	102,483.1
2004	13,637.2	2,444.8	2,090.0	55.0	0.0	0.0	179,691.3	84,729.9
2005	32,394.9	11,421.9	0.0	0.0	648.7	0.0	315,025.0	178,078.8
2006	126,254.8	29,620.3	2,814.3	596.7	465.3	295.3	593,199.8	296,117.8
2007	629,369.7	30,953.5	24,518.6	509.0	1,167.7	220.0	1,297,066.2	620,470.6
2008	526,233.6	18,197.1	43,755.3	0.0	35,800.3	200.0	1,360,138.6	664,950.9
2009	191,699.9	32,963.5	31,311.7	480.0	350,894.3	697.7	601,796.4	304,409.0
2010	115,767.7	17,734.0	17,896.5	450.0	197,339.1	2,283.9	831,285.8	448,879.4
2011.6	45,824.5	15,342.0	1,965.6	110.0	186,086.0	3,265.9	429,961.2	212,345.0
Cumulative	1,727,017.0	179,814.8	161,440.0	4,084.2	831,920.2	52,658.8	6,772,907.4	3,658,561.7
Manufac/C umul(%)		10.4		2.5		6.3		54.0

Table 1. Korea's ODI toward CLMV (~2011. 6)

(Unit: USD in thousands)

Source: Korea Export-Import Bank.

2. CLMV MANUFACTURING AND COMPETITIVENESS STRUCTURES

2.1. Structural Changes in the CLMV Manufacturing Industries

2.1.1. Methodology

In order to analyze the manufacturing industries of CLMV countries by sub-categories, the data of UNIDO INDSTAT4 was used up to year 2011. INDSTAT provides data on sub-categories for businesses using three and four digit codes from the ISIC (International Standard Industrial Classification of all Economic Activities) Revision 3. However, in this study, they were reclassified into 24 industry sectors according to their various features. Moreover, in order to examine industry structure and developments, the change in percentage in sub-categories from the first and final years in the annual data provided by INDSTAT was examined. However, because data for Myanmar's manufacturing industry was not listed in UNIDO, it was excluded from this analysis. Since the only data available for Laos was the year 1999, only the percentage by manufacturing industry sector in that year was analyzed.

2.1.2. Percentage change of CLMV sub-categories in manufacturing industries

Vietnam, which is undergoing rapid industrialization since reforms were introduced, still relies heavily on the processed food sector ('processed meat, fish, fruits, vegetables, and fats'), but the 'furniture' and 'building and repairing of ships and boats' sectors are continuously growing. In 2008, the sector that took up the largest share was 'processed food', representing 24.84% of total manufacturing production. This was followed by 'basic chemical products' and 'structural metal products'. When examining the changes in share, it is noted that while investments in the 'clothing (wearing apparel, except fur apparel)' and 'textile (spinning, weaving and finishing of textiles)' sectors, traditionally the major targets of investment, slightly decreased, the shares of 'structural metal products' and 'building and repairing of ships and boats' sectors increased. Such a change is related to the fact that in the early stages of reforms and market opening, foreign investors in Vietnam concentrated mostly on fibers, sewing, and businesses requiring simple assembly lines. However, it has been gradually changing to businesses that require large-scale capital investments and technologies, such as the automobile and shipbuilding industries (Table 2).

While the processed food sector ('processed meat, fish, fruits, vegetables, and fats') and the 'sawmilling and planing of wood' sector dropped considerably in Cambodia, there was an increase in the 'clothing (wearing apparel, except fur apparel)' and 'textile (spinning, weaving, and finishing of textiles)' sectors. In 1993, processed food accounted for 37.63%, but in 2000, it dropped by a notable 26.24% point to 11.39%. On the other hand, the initial year's shares for clothing and textiles were at about 1%, but, by the final year, they became the largest industries at 41% point and 32.75% point, respectively. This appears to be related to the fact that FDI to Cambodia in the 1990s was concentrated mostly on the fiber and sewing industries (Table 3).

In the case of Laos, manufacturing industries include the 'clothing (wearing apparel, except fur apparel)', 'processed food (processed meat, fish, fruits, vegetables, and fats)', and wood processing ('sawmilling and planing of wood') sectors. As of 1999, the largest industry was 'clothing', which accounted for 33.44%, followed by 'processed food' (18.97%), and 'wood processing' (15.36%). This demonstrates that manufacturing in Laos is mainly comprised of labor-intensive industries. Meanwhile, compared to the development level of manufacturing industries in Laos, motor vehicles were found to be high at 5.69% and the 'building and repairing of ships and boats' sector at 2.62%. This is assessed to be related to the operation of the automobile assembly plant of Kolao Group (Table 4).

Table 2. Structural Change by Sub-category of Manufacturing Industries in Vietnam (1998→2008)

				(Unit: %)
	Category	1998Year	2008Year	Changes
		(A)	(B)	$(A \rightarrow B)$
1	Processed meat, fish, fruit, vegetables, fats	24.52	24.84	0.32
2	Tobacco products	4.12	1.20	-2.92
3	Spinning, weaving and finishing of textiles	7.30	4.59	-2.70
4	Wearing apparel, except fur apparel	4.11	4.96	0.85
5	Tanning, dressing and processing of leather	7.02	4.20	-2.82
6	Sawmilling and planing of wood	1.14	2.00	0.85
7	Furniture	0.74	5.15	4.40
8	Paper and paper products	2.88	2.37	-0.51
9	Publishing	2.51	1.25	-1.26
10	Coke oven products	0.57	0.41	-0.16
11	Basic chemicals	8.46	6.98	-1.48
12	Rubber products	3.76	5.18	1.42
13	Glass and glass products	7.94	6.15	-1.79
14	Basic iron and steel	4.99	5.25	0.26
15	Structural metal products; tanks; steam generators	2.74	6.19	3.45
16	General purpose machinery	2.18	1.67	-0.51
17	Office, accounting and computing machinery	4.02	1.91	-2.11
18	Electric motors, generators and transformers	2.68	4.23	1.56
19	Electronic valves, tubes, etc.	4.56	2.24	-2.32
20	Medical, measuring, testing appliances, etc.	0.35	0.75	0.39
21	Motor vehicles	1.46	3.37	1.91
22	Building and repairing of ships and boats	0.84	5.02	4.18
23	Recycling of metal waste and scrap	0.00	0.10	0.10
24	Manufacturing n.e.c.	1.09	0.00	-1.09

Source: By the author based on statistics from INDSTAT4 2011 ISIC Rev.3, UNIDO (2011).

Table 3. Structural Change by Sub-category of Manufacturing Industries in Cambodia (1993→2000)

				(Unit: %)
	Category	1993Year	2000Year	Changes
	Category	(A)	(B)	$(A \rightarrow B)$
1	Processed meat, fish, fruit, vegetables, fats	37.63	11.39	-26.24
2	Tobacco products	19.55	1.85	-17.70
3	Spinning, weaving and finishing of textiles	1.02	33.59	32.57
4	Wearing apparel, except fur apparel	1.47	42.48	41.00
5	Tanning, dressing and processing of leather	0.00	5.03	5.03
6	Sawmilling and planing of wood	17.94	0.43	-17.51
7	Furniture	1.75	0.16	-1.59
8	Paper and paper products	0.18	0.01	-0.17
9	Publishing	0.20	0.01	-0.19
10	Coke oven products	0.00	0.00	0.00
11	Basic chemicals	1.72	0.10	-1.61
12	Rubber products	12.67	3.54	-9.13
13	Glass and glass products	4.10	0.27	-3.83
14	Basic iron and steel	0.81	0.00	-0.80
15	Structural metal products; tanks; steam generators	0.92	0.95	0.03
16	General purpose machinery	0.00	0.01	0.01
17	Office, accounting and computing machinery	0.00	0.00	0.00
18	Electric motors, generators and transformers	0.00	0.00	0.00
19	Electronic valves, tubes, etc.	0.00	0.00	0.00
20	Medical, measuring, testing appliances, etc.	0.00	0.00	0.00
21	Motor vehicles	0.00	0.17	0.17
22	Building and repairing of ships and boats	0.00	0.00	0.00
23	Recycling of metal waste and scrap	0.00	0.02	0.02
24	Manufacturing n.e.c.	0.05	0.00	-0.05

Source: By the author based on statistics from INDSTAT4 2011 ISIC Rev.3, UNIDO (2011).

Table 4. Structural Change by Sub-category of Manufacturing Industries in Laos (1993→2000)

		(Unit: %)
	Category	1999Year
1	Processed meat, fish, fruit, vegetables, fats	18.97
2	Tobacco products	6.07
3	Spinning, weaving and finishing of textiles	0.39
4	Wearing apparel, except fur apparel	33.44
5	Tanning, dressing and processing of leather	0.00
6	Sawmilling and planing of wood	15.36
7	Furniture	0.00
8	Paper and paper products	0.44
9	Publishing	0.95
10	Coke oven products	0.00
11	Basic chemicals	2.58
12	Rubber products	2.02
13	Glass and glass products	4.74
14	Basic iron and steel	1.94
15	Structural metal products; tanks; steam generators	3.54
16	General purpose machinery	0.76
17	Office, accounting and computing machinery	0.00
18	Electric motors, generators and transformers	0.50
19	Electronic valves, tubes, etc.	0.00
20	Medical, measuring, testing appliances, etc.	0.00
21	Motor vehicles	5.69
22	Building and repairing of ships and boats	2.62
23	Recycling of metal waste and scrap	0.00
24	Manufacturing n.e.c.	0.00

Source: By the author based on statistics from INDSTAT4 2011 ISIC Rev.3, UNIDO (2011).

2.2. Competitiveness Change in CLMV Manufacturing Industries

In this part, the overall conditions and changes, such as each nation's competitiveness by industry (comparative advantage and trade specialization) and trade patterns will be examined by analyzing the trade structure of CLMV using selected methods. To analyze the competitiveness of industries (products) using trade statistics, the NRCA index and TSI were used, while the IIT index was used to reveal trade patterns.

2.2.1. Analysis model

A. NRCA

Though there are a number of ways to analyze comparative advantage, the most commonly used method is the Revealed Comparative Advantage (RCA) index that was proposed by B. Balassa. The RCA index is an adjusted trade performance index using the level of importance of a product and the size of a country in order to compare exports or pure exports (export-import) trade changes among countries or industries. Normally, when the RCA index is larger than 1, it is interpreted that the product (industry) of the respective country has a comparative advantage compared to other products (industries) of that country. The formula is seen below:

$$\mathcal{RCA}_{iw}^{k} = \frac{\chi_{iw}^{k} / \chi_{ww}^{k}}{\chi_{iw} / \chi_{ww}}$$

 \mathcal{RCA}_{iw}^{k} : presents RCA index to the world for country i and product (industry) k \mathcal{X}_{iw}^{k} : amount of exports to the world for country i and product (industry) k \mathcal{X}_{ww}^{k} : amount of exports to the world for product (industry) k \mathcal{X}_{iw} : total amount of exports to the world for country i \mathcal{X}_{ww} : total amount of exports to the world Meanwhile, though Balassa's RCA index is used widely in various studies, the index itself contains distortion factors. Therefore, though the value of an industry at a specific time may be noteworthy, the comparison results between countries and time periods do not necessarily have meaning. Hillman (1980) and Yeats (1985) point out that because of the (1) asymmetry of the RCA index and the fact that (2) countries with a small percentage of global exports have relatively higher indices, there is a possibility that when the size of the RCA index is simply compared between nations or years, it may end up giving inaccurate results. In order to address such problems, several studies were conducted on the comparative advantage index. Subsequently, the Normalized RCA (hereafter called NRCA), which was upgraded to compare Balassa's RCA index with each year and among three nations, was proposed.

In order to supplement Balassa's RCA index to make comparisons between different years and among three countries, NRCA deducts the product j export amount of country i while product j of country i is in neutral to deduce the export performance, and then, by dividing this with the global export amount, it is possible to assess the comparative advantage. The export performance (ΔE_j^i) of product j of country i is calculated as seen below.

$$\Delta \mathbf{E}_{j}^{i} = \mathbf{E}_{j}^{i} - \hat{\mathbf{E}}_{j}^{i} = \mathbf{E}_{j}^{i} - (\mathbf{E}^{i}\mathbf{E}_{j}) / \mathbf{E}$$

 $E_{\dot{j}}^{i}$: actual export amount to the world for product (industry) j of country i

- E^{*i*}: export amount to the world for country i
- E_{i} : export amount to the world for product j

E: export amount to the world

When the above formula is divided by the entire world's export market or the entire world's export amount (E), the NRCA can be found.

 $\mathcal{NRCA}_{j}^{i} = \Delta E_{j}^{i} / E = E_{j}^{i} / E - \widehat{E}_{j}^{i} / E = E_{j}^{i} / E - (E^{i}E_{j}) / EE$ $\mathcal{NRCA}_{j}^{i} = \Delta E_{j}^{i}: \text{NRCA of product (industry) j for country i}$

The NRCA index is a method for measuring the deviation of a nation's actual exports from a comparative advantage neutral status for that nation's relative scale from a global export-market perspective. Therefore, when neutral, the NRCA index is 0. The maximum value is 0.25 and the minimum value is 0.25. In addition, when a country's product or industry is made up of a total of n, when the NRCA of n products (industries) are all totaled, it becomes 0 and the total NRCA of all countries in the world for a certain product (industry) j also becomes 0.³ Furthermore, the NRCA value of each product (industry) can be compared with other products (industries), countries, and time periods. Moreover, the NRCA values can be compared to measure the size of the comparative advantage.

B. TSI

Even if a country's comparative advantage by industry is found, if that is immediately connected to the respective nation's industrial structure, then the extraordinary factors of the individual country become overlooked. In particular, even if it is an industry that has a comparative disadvantage, when it is promoted through policy measures, it may become specialized as a product for export and be exported to the global market. Therefore, in this study, the Trade Specialization Index (TSI), which evaluates competitiveness through trade specialization levels of each country, was analyzed. TSI is an index that can analyze the competitiveness between two countries in a specific

³ However, because in this study only industrial products, excluding some products (plants and animals, minerals) that are being traded as presented in the industrial categorization standards, are categorized by industry and of which the NRCA is found, the total NRCA of all industries of a specific nation may not equal 0.

market. In other words, it is an index that expresses comparative advantage in exports and it is the value found by dividing the difference of exports and imports of each product by the trade scale (total exports and imports) of the respective product. This index was made under the assumption that in trade between two countries, competitive products will be exported more than imported. The index is defined below:

$$\mathcal{TSI}_{ij}^{\pounds} = \frac{\chi_{ij}^{\pounds} - \mathcal{M}_{ij}^{\pounds}}{\chi_{ij}^{\pounds} + \mathcal{M}_{ij}^{\pounds}}$$

 TSI_{ij}^{k} : TSI to another country j for a country i's product k

 \mathcal{X}_{ij}^{k} : export amount to another country j for a country i's product k

 $\mathcal{M}_{ij}^{\mathcal{R}}$: import amount from another country j for a country i's product k

TSI has a value between -1 and 1. When the index value nears -1, it means that industry has a higher level of import specialization and when it nears 1, it means that industry has a higher level of export specialization. Also, when making comparisons after finding the TSI value of the base year and the year being compared, if the TSI value of the year being compared has a larger value than the base year, it can be assessed that export competitiveness is rising. On the other hand, if the TSI value of the year being compared is smaller than that of the base year, it means that export competitiveness is weakening. When it is given that the base year is 0 and the year being compared is t, then it can be defined as follows:

O When export competitiveness becomes stronger

- \checkmark 0<TSI0<TSIt: strengthen competitiveness as export specialized product
- \checkmark TSI0<0<TSIt: convert from import specialization to export specialization
- ✓ TSI0<TSIt<0: further weaken competitiveness through import specialized product

O When export competitiveness becomes weaker

 \checkmark 0<TSIt<TSI0: export specialized product, but losing competitiveness

✓ TSIt<0<TSI0: convert from export specialized product to import specialized product (loss of competitiveness)

✓ TSIt<TSI0<0: further import specialization

C. IIT

In this study, aside from analyzing the competitiveness by industry (NRCA and TSI analysis), the trade patterns of each country were also analyzed. The trade pattern of each country was identified by deducing the Intra-Industry Trade index that judges whether or not there is intra-industry trade occurring. Currently, the most commonly used index for IIT index is that developed by Grubel-Lloyd (1975) and, through this, it is possible to identify whether trade between two countries shows inter-industry trade or intra-industry trade:

$$\mathcal{IIT}_{ij}^{\mathcal{R}} = \frac{\left(\mathcal{X}_{ij}^{\mathcal{R}} + \mathcal{X}_{ji}^{\mathcal{R}}\right) - \left|\mathcal{X}_{ij}^{\mathcal{R}} - \mathcal{X}_{ji}^{\mathcal{R}}\right|}{\left(\mathcal{X}_{ij}^{\mathcal{R}} + \mathcal{X}_{ji}^{\mathcal{R}}\right)}$$

 \mathcal{IIT}_{ii}^{k} : intra-industry trade pattern of country j for product k of country i

 \mathcal{X}_{ij}^{k} : export to country j for product k of country i

 $\mathcal{X}_{ji}^{\mathbb{A}}$: export to country i for product k of country j

(import to country j for product k of country i)

The value of IIT becomes $0\sim1$. When there is active intra-industrial trade between the two countries and, thus, the export and import amount for the respective industry becomes similar, then the IIT value becomes close to 1. However, when there is one-way trade, causing a bigger difference in export and import amounts, the IIT value becomes close to 0. Furthermore, the right side numerator value $((\chi_{ij}^{k} + \chi_{ji}^{k}) - |\chi_{ij}^{k} - \chi_{ji}^{k}|)$ in the above IIT formula represents the amount of trade that makes up the balance in trade between two countries. Hence, the IIT value represents in percentage terms the amount that makes up the trade balance in the total trade amount $(\chi_{ij}^{k} + \chi_{ji}^{k})$ between the two countries. In other words, 0.5 for the IIT value means that 50% of the trade amount between the two countries has achieved trade balance. Thus, if the IIT value becomes larger than 0.5, the trade between the two countries leans more toward a mutually supplementing intra-industry trade compared to normal inter-industry trade. If the value is smaller than 0.5, the trade between the two countries leans more towards one-way export or import, rather than intra-industry trade.

2.2.2. Analysis data and industry category

In order to analyze the trade structure of the four CLMV countries, this study used import/export data provided by UN Comtrade. After reviewing the usefulness of the import/export data of each country from UN Comtrade, it was found that data for the years 2000, 2008 and 2009 was useful, and data for years 2000 and 2009 is compared in this study. However, in the case of Cambodia, Myanmar and Laos, the import/export data is not properly calculated and reported and, therefore, 'mirror statistics' were used. In other words, the import/exports of countries around the world that traded with these countries were calculated, and their imports from Cambodia, Myanmar, and Laos were deemed as these nations' exports. The exports of the world to Cambodia, Myanmar, and Laos were deemed as these nations' imports.

In this study, the UN Comtrade's HS-92 4 digit standard import/export data was

used and, in order to connect it with the UNIDO data, the industrial classification for the manufacturing industry in this study was categorized into 24 sub-industries. However, from the HS-92 4 unit standard import/export data, products corresponding to plants and animals and minerals that are not included in the manufacturing industry were excluded from analysis. Also, 'recycling metal wastes and scrap' that is categorized in the UNIDO data was also excluded because it could not be linked with the HS Code (The Harmonized Commodity Description and Coding System). Furthermore, the industrial classification of UNIDO data was drafted based on ISIC 3.0, but there were limitations: for the import/export data of UN Comtrade only the HS standards and SITC standards data could be obtained. In order to overcome this in the study, the Bank of Korea (2004) was taken into reference to link with the ISIC 3.0 categorization and HS-92 categorization to classify the industries as seen in Table 5.

	Category in UNIDO	HS 92 Code 4Digit
01	Processed meat, fish, fruit, vegetables, fats	0201-2309
02	Tobacco products	2401-2403
03	Spinning, weaving and finishing of textiles	5001-6002
04	Wearing apparel, except fur apparel	6101-6310
05	Tanning, dressing and processing of leather	4101-4304, 6401-6704
06	Sawmilling and planing of wood	4401-4707
07	Furniture	9401-9404
08	Paper and paper products	4801-4823
09	Publishing	4901-4911
10	Coke oven products	2701-2716
11	Basic chemicals	2801-3823
12	Rubber products	3901-4017
13	Glass and glass products	6801-7118
14	Basic iron and steel	7201-8113
15	Structural metal products; tanks; steam generators	8201-8311, 8401-8404
16	General purpose machinery	8405-8468, 8474-8485
17	Office, accounting and computing machinery	8469-8473
18	Electric motors, generators and transformers	8501-8517
19	Electronic valves, tubes, etc.	8518-8548
20	Medical, measuring, testing appliances, etc.	9001-9114
21	Motor vehicles	8701-8716
22	Building and repairing of ships and boats	8601-8609, 8801-8908
23	Recycling of metal waste and scrap	-
24	Manufacturing n.e.c.	9201-9307, 9405-9406, 9501-9999
*	Plants and animals	0101-0106
**	Minerals	2501-2621

Table 5. Industrial Categorization Standard

Source: UN Comtrade; Bank of Korea 2004.

2.2.3. Analysis results by country

A. Cambodia

An examination of the competitiveness by industry for Cambodia, based on comparative advantage, reveals that industries that possess competitiveness among a total of 23 industries as of 2009 include only four: 'clothing (wearing apparel, except

fur apparel)', 'tanning, dressing, and processing leather', 'sawmilling and planing of wood', and 'glass and glass products'. Moreover, with the exception of 'clothing', the level of comparative advantage is very low. Meanwhile, in the case of industries displaying comparative disadvantage, most of them do not have any exports and, therefore, the value of the NRCA index does not have significant meaning (Table 6).

Only three of the four industries that have comparative advantage in Cambodia: 'clothing', 'tanning, dressing, and processing leather', and 'sawmilling and planing of wood' show export specialization, while the remaining 20 industries are specialized in imports. In conclusion, it is assessed that aside from some light industry sectors, Cambodia has a weak industrial base and, therefore, is currently unable to achieve competitiveness (Table 6).

Analysis of Cambodian trade patterns showed that there were some areas where there were partial changes from inter-industry trade to intra-industry trade. However, the only industries with 0.5 or higher IIT value in 2009 were 'rubber products' and 'glass and glass products'. All the other industries showed inter-industry oriented trade. But, the export-oriented 'clothing (wearing apparel, except fur apparel)' and 'tanning, dressing and processing leather' industries show patterns of inter-industrial trade, while other industries (excluding 'rubber products' and 'glass and glass products') show a dominant pattern of intra-industry trade that is focused on one-way imports (Table 7).

Table 6. Competitiveness by Sub-category of Manufacturing Industry ofCambodia

		NRCA Result					TSI Result		
	Industry	2000	2009	Growth (%)	Feature	2000	2009	Feature	
01	Processed meat, fish, fruit, vegetables, fats	-0.000013	-0.000018	-42.0	Comparative disadvantage intensified	-0.701	-0.620	Import specialization improved	
02	Tobacco products	-0.000001	0.000000	88.1	Comparative disadvantage improved	-0.996	-0.886	Import specialization improved	
03	Spinning, weaving and finishing of textiles	-0.000005	-0.000006	-11.8	Comparative disadvantage intensified	-0.970	-0.987	Import specialization intensified	
04	Wearing apparel, except fur apparel	0.000192	0.000284	48.0	Comparative advantage strengthened	0.896	0.917	Export specialization strengthened	
05	Tanning, dressing and processing of leather	0.000016	0.000025	55.6	Comparative advantage strengthened	0.726	0.699	Export specialization weakened	
06	Sawmilling and planing of wood	0.000008	0.000001	-92.5	Comparative advantage weakened	0.958	0.782	Export specialization weakened	
07	Furniture	-0.000002	-0.000004	-65.1	Comparative disadvantage intensified	-0.620	-0.881	Import specialization intensified	
08	Paper and paper products	-0.000004	-0.000005	-21.0	Comparative disadvantage intensified	-0.971	-0.957	Import specialization improved	
09	Publishing	-0.000001	-0.000001	-42.0	Comparative disadvantage intensified	-0.970	-0.964	Import specialization improved	
10	Coke oven products	-0.000025	-0.000051	-109.3	Comparative disadvantage intensified	-1.000	-1.000	Import specialization intensified	
11	Basic chemicals	-0.000018	-0.000038	-107.8	Comparative disadvantage intensified	-0.990	-0.985	Import specialization improved	
12	Rubber products	-0.000001	-0.000008	-460.6	Comparative disadvantage intensified	0.038	-0.378	Export specialization converted to Import specialization	
13	Glass and glass products	-0.000007	0.000001	n/a	Comparative disadvantage converted to Comparative advantage	-0.797	-0.216	Import specialization improved	
14	Basic iron and steel	-0.000013	-0.000022	-70.1	Comparative disadvantage intensified	-0.890	-0.800	Import specialization improved	
15	Structural metal products; tanks; steam generators	-0.000002	-0.000003	-57.7	Comparative disadvantage intensified	-0.977	-0.908	Import specialization improved	
16	General purpose machinery	-0.000022	-0.000036	-65.3	Comparative disadvantage intensified	-0.947	-0.953	Import specialization intensified	
17	Office, accounting and computing machinery	-0.000014	-0.000013	5.2	Comparative disadvantage improved	-0.950	-0.975	Import specialization intensified	
18	Electric motors, generators and transformers	-0.000009	-0.000014	-61.2	Comparative disadvantage intensified	-0.959	-0.987	Import specialization intensified	
19	Electronic valves, tubes, etc.	-0.000029	-0.000036	-25.4	Comparative disadvantage intensified	-0.936	-0.978	Import specialization intensified	
20	Medical, measuring, testing appliances, etc.	-0.000008	-0.000014	-61.5	Comparative disadvantage intensified	-0.919	-0.954	Import specialization intensified	
21	Motor vehicles	-0.000022	-0.000022	0.0	Comparative disadvantage improved	-0.976	-0.620	Import specialization improved	
22	Building and repairing of ships and boats	-0.000006	-0.000009	-54.4	Comparative disadvantage intensified	-0.701	-0.794	Import specialization intensified	
24	Recycling of metal waste and scrap	-0.000012	-0.000023	-96.4	Comparative disadvantage intensified	-0.720	-0.620	Import specialization improved	

	Industry	2000	2009	Feature
01	Processed meat, fish, fruit, vegetables, fats	0.299	0.380	Inter-industry trade oriented
02	Tobacco products	0.004	0.114	Inter-industry trade oriented
03	Spinning, weaving and finishing of textiles	0.030	0.013	Inter-industry trade oriented
04	Wearing apparel, except fur apparel	0.104	0.083	Inter-industry trade oriented
05	Tanning, dressing and processing of leather	0.274	0.301	Inter-industry trade oriented
06	Sawmilling and planing of wood	0.042	0.218	Inter-industry trade oriented
07	Furniture	0.380	0.119	Inter-industry trade oriented
08	Paper and paper products	0.029	0.043	Inter-industry trade oriented
09	Publishing	0.030	0.036	Inter-industry trade oriented
10	Coke oven products	0.000	0.000	Inter-industry trade oriented
11	Basic chemicals	0.010	0.015	Inter-industry trade oriented
12	Rubber products	0.962	0.622	Intra-industry trade oriented
13	Glass and glass products	0.203	0.784	Inter-industry trade converted to Intra-industry trade
14	Basic iron and steel	0.110	0.200	Inter-industry trade oriented
15	Structural metal products; tanks; steam generators	0.023	0.092	Inter-industry trade oriented
16	General purpose machinery	0.053	0.047	Inter-industry trade oriented
17	Office, accounting and computing machinery	0.050	0.025	Inter-industry trade oriented
18	Electric motors, generators and transformers	0.041	0.013	Inter-industry o trade riented
19	Electronic valves, tubes, etc.	0.064	0.022	Inter-industry trade oriented
20	Medical, measuring, testing appliances, etc.	0.081	0.046	Inter-industry trade oriented
21	Motor vehicles	0.024	0.380	Inter-industry trade oriented
22	Building and repairing of ships and boats	0.299	0.206	Inter-industry trade oriented
24	Recycling of metal waste and scrap	0.280	0.380	Inter-industry trade oriented

Table 7. Trade Pattern by Sub-category of Manufacturing Industry of Cambodia

B. Laos

Since the scope of trade is small, analysis of competitiveness for Laos in this way is meaningful only as a reference. When examining the comparative advantage analysis, there were four industries ('processed meat, fish, fruit, vegetables, fats', 'wearing apparel, except fur apparel', 'sawmilling and planing of wood', and 'basic iron and steel') that had comparative advantage as of 2009, but its level was very low. The TSI analysis showed that as of 2009, 'wearing apparel, except fur apparel', 'tanning, dressing, and processing of leather', 'sawmilling and planing of wood', and 'basic iron and steel' industries were specialized in export. 'Food (processed meat, fish, fruit, vegetables, fats)' had a comparative advantage, but it displayed an import-specialized pattern. On the other hand, the 'tanning, dressing, and processing of leather' industry had a comparative disadvantage, but somewhat specialized in export. Hence, with the exception of some light industries such as 'food', 'clothing', and wood products, the domestic industrial infrastructure for domestic demand and exports was very weak (Table 8).

On the other hand, the trade pattern of Laos showed that from 2000 to 2009, the IIT index rose slightly, but, with the exception of some industries ('processed meat, fish, fruit, vegetables, fats', 'tanning, dressing and processing of leather', and 'basic iron and steel), inter-industry trade predominated. Excluding some industries, the IIT index value was much below 0.5, which is evidence that there was one-way inter-industry trade. In other words, for clothing and wood products, there was inter-industry trade that was export-oriented, while in other industries there was inter-industry trade that was import-oriented (Table 9).

		NRCA Result					TSI Result		
	Industry	2000 2009 Growth Feature		Feature	2000	2009	Feature		
01	Processed meat, fish, fruit, vegetables, fats	0.000000	0.000001	654.4	Comparative advantage strengthened	-0.527	-0.390	Import specialization improved	
02	Tobacco products	0.000000	0.000000	63.3	Comparative disadvantage improved	-1.000	-0.504	Import specialization improved	
03	Spinning, weaving and finishing of textiles	-0.000001	-0.000002	-23.8	Comparative disadvantage intensified	-0.985	-0.972	Import specialization improved	
04	Wearing apparel, except fur apparel	0.000019	0.000010	-46.6	Comparative advantage weakened	0.883	0.617	Export specialization weakened	
05	Tanning, dressing and processing of leather	0.000000	-0.000001	-212.0	Comparative disadvantage intensified	0.230	0.101	Export specialization weakened	
06	Sawmilling and planing of wood	0.000018	0.000015	-13.8	Comparative advantage weakened	0.986	0.944	Export specialization weakened	
07	Furniture	-0.000001	-0.000001	-53.8	Comparative disadvantage intensified	-0.803	-0.562	Import specialization improved	
08	Paper and paper products	-0.000001	-0.000001	-47.9	Comparative disadvantage intensified	-0.996	-0.992	Import specialization improved	
09	Publishing	0.000000	0.000000	-45.9	Comparative disadvantage intensified	-0.977	-0.809	Import specialization improved	
10	Coke oven products	-0.000005	-0.000006	-3.1	Comparative disadvantage intensified	-0.962	-0.632	Import specialization improved	
11	Basic chemicals	-0.000004	-0.000009	-104.6	Comparative disadvantage intensified	-0.973	-0.700	Import specialization improved	
12	Rubber products	-0.000002	-0.000003	-48.6	Comparative disadvantage intensified	-0.949	-0.718	Import specialization improved	
13	Glass and glass products	-0.000002	-0.000004	-140.2	Comparative disadvantage intensified	-0.979	-0.970	Import specialization improved	
14	Basic iron and steel	-0.000003	0.000025	n/a	Comparative disadvantage converted to comparative advantage	-0.990	0.237	Import specialization converted to Export specialization	
15	Structural metal products; tanks; steam generators	0.000000	-0.000001	-90.0	Comparative disadvantage intensified	-0.996	-0.964	Import specialization improved	
16	General purpose machinery	-0.000005	-0.000010	-86.6	Comparative disadvantage intensified	-0.991	-0.930	Import specialization improved	
17	Office, accounting and computing machinery	-0.000003	-0.000004	-13.4	Comparative disadvantage intensified	-0.991	-0.954	Import specialization improved	
18	Electric motors, generators and transformers	-0.000002	-0.000003	-63.4	Comparative disadvantage intensified	-0.970	-0.893	Import specialization improved	
19	Electronic valves, tubes, etc.	-0.000007	-0.000010	-41.9	Comparative disadvantage intensified	-0.972	-0.850	Import specialization improved	
20	Medical, measuring, testing appliances, etc.	-0.000002	-0.000004	-86.5	Comparative disadvantage intensified	-0.987	-0.921	Import specialization improved	
21	Motor vehicles	0.000005	-0.000007	n/a	Comparative advantage converted to comparative disadvantage	-0.270	-0.948	Import specialization intensified	
22	Building and repairing of ships and boats	-0.000001	-0.000003	-93.5	Comparative disadvantage intensified	-0.998	-0.996	Import specialization improved	
24	Recycling of metal waste and scrap	-0.000002	-0.000007	-268.1	Comparative disadvantage intensified	-0.207	-0.871	Import specialization intensified	

Table 8. Competitiveness by Sub-category of Manufacturing Industry of Laos

	Industry	2000	2009	Feature
01	Processed meat, fish, fruit, vegetables, fats	0.473	0.610	Inter-industry trade converted to Intra-industry trade
02	Tobacco products	0.000	0.496	Inter-industry trade oriented
03	Spinning, weaving and finishing of textiles	0.015	0.028	Inter-industry trade oriented
04	Wearing apparel, except fur apparel	0.117	0.383	Inter-industry trade oriented
05	Tanning, dressing and processing of leather	0.770	0.899	Intra-industry trade oriented
06	Sawmilling and planing of wood	0.014	0.056	Inter-industry trade oriented
07	Furniture	0.197	0.438	Inter-industry trade oriented
08	Paper and paper products	0.004	0.008	Inter-industry trade oriented
09	Publishing	0.023	0.191	Inter-industry trade oriented
10	Coke oven products	0.038	0.368	Inter-industry trade oriented
11	Basic chemicals	0.027	0.300	Inter-industry trade oriented
12	Rubber products	0.051	0.282	Inter-industry trade oriented
13	Glass and glass products	0.021	0.030	Inter-industry trade oriented
14	Basic iron and steel	0.010	0.763	Inter-industry trade converted to Intra-industry trade
15	Structural metal products; tanks; steam generators	0.004	0.036	Inter-industry trade oriented
16	General purpose machinery	0.009	0.070	Inter-industry trade oriented
17	Office, accounting and computing machinery	0.009	0.046	Inter-industry trade oriented
18	Electric motors, generators and transformers	0.030	0.107	Inter-industry trade oriented
19	Electronic valves, tubes, etc.	0.028	0.150	Inter-industry trade oriented
20	Medical, measuring, testing appliances, etc.	0.013	0.079	Inter-industry trade oriented
21	Motor vehicles	0.730	0.052	Intra-industry trade converted to Inter-industry trade
22	Building and repairing of ships and boats	0.002	0.004	Inter-industry trade oriented
24	Recycling of metal waste and scrap	0.793	0.129	Intra-industry trade converted to Inter-industry trade

Table 9. Trade Pattern by Sub-category of Manufacturing Industry of Laos

C. Myanmar

An examination of the competiveness deduced from the trade of Myanmar, as of 2009, shows that the country possessed some level of competitiveness in 'food (processed meat, fish, fruit, vegetables, fats)', 'clothing', 'tanning, dressing, and processing of leather', 'sawmilling and planing of wood', and 'coke oven products'. However, it is judged that in all other industries, its competitiveness was very weak. As of 2009, there were five industries that had comparative advantage, but among these, with the exception of coke oven products, the level of comparative advantage was not high. Furthermore, it was found that except for these five industries with comparative

advantage and 'office, accounting and computing machinery', all industries had intensifying levels of comparative disadvantage. Moreover, as of 2009, Myanmar was showing export specialization only in the five industries with comparative advantage and in 'glass and glass products', while all other industries were displaying import specialization (Table 10).

The trade pattern of Myanmar, like Cambodia and Laos, showed a growth in IIT value from 2000 to 2009. In short, it showed that there was a gradual shift from inter-industry trade towards intra-industry trade, but still, in most industries, the IIT value did not approach 0.5. 'Clothing (wearing apparel, except fur apparel)' and 'sawmilling and planing wood', in which Myanmar had export specialization, indicated strong export-oriented inter-industry trade features. Moreover, it suggested that there was more intra-industry trade in processed food, 'tanning, dressing and processing of leather', furniture, and 'glass and glass products'. One feature unlike other countries was that among industries categorized as 10~22, many industries ('coke oven products', 'basic iron and steel', 'office, accounting and computing machinery', 'electric motors, generators and transformers', 'electronic valves, tubes, etc.') showed a very low IIT index value and, in fact, from 2000 to 2009, the value actually decreased. It has been concluded that while the industrial infrastructure of the respective sectors had not been established, the domestic demand continued to grow and, thus, Myanmar relied completely on imports (Table 11).

Table 10. Competitiveness by Sub-category of Manufacturing Industry ofMyanmar

In heaters?		NRCA Result					TSI Result		
	Industry	2000	2009	Growth (%)	Feature	2000	2009	Feature	
01	Processed meat, fish, fruit, vegetables, fats	0.000040	0.000097	139.9	Comparative advantage strengthened	0.178	0.357	Export specialization strengthened	
02	Tobacco products	-0.000001	-0.000001	-28.2	Comparative disadvantage intensified	-0.995	-0.982	Import specialization improved	
03	Spinning, weaving and finishing of textiles	-0.000007	-0.000007	-3.8	Comparative disadvantage intensified	-0.977	-0.986	Import specialization intensified	
04	Wearing apparel, except fur apparel	0.000121	0.000025	-79.4	Comparative advantage weakened	0.877	0.753	Export specialization weakened	
05	Tanning, dressing and processing of leather	0.000000	0.000000	n/a	Comparative disadvantage converted to Comparative advantage	0.265	0.067	Export specialization weakened	
06	Sawmilling and planing of wood	0.000069	0.000052	-24.1	Comparative advantage weakened	0.987	0.982	Export specialization weakened	
07	Furniture	0.000000	-0.000004	-985.1	Comparative disadvantage intensified	0.473	-0.464	Export specialization converted to Import specialization	
08	Paper and paper products	-0.000005	-0.000006	-19.6	Comparative disadvantage intensified	-0.987	-0.995	Import specialization intensified	
09	Publishing	-0.000001	-0.000002	-39.1	Comparative disadvantage intensified	-0.984	-0.989	Import specialization intensified	
10	Coke oven products	-0.000012	0.000156	n/a	Comparative disadvantage converted to Comparative advantage	-0.519	0.566	Import specialization converted to Export specialization	
11	Basic chemicals	-0.000023	-0.000047	-104.3	Comparative disadvantage intensified	-0.972	-0.989	Import specialization intensified	
12	Rubber products	-0.000010	-0.000015	-54.2	Comparative disadvantage intensified	-0.780	-0.666	Import specialization improved	
13	Glass and glass products	-0.000005	-0.000010	-101.1	Comparative disadvantage intensified	-0.117	0.135	Import specialization converted to Export specialization	
14	Basic iron and steel	-0.000010	-0.000028	-193.2	Comparative disadvantage intensified	-0.637	-0.922	Import specialization intensified	
15	Structural metal products; tanks; steam generators	-0.000003	-0.000004	-55.9	Comparative disadvantage intensified	-0.987	-0.982	Import specialization improved	
16	General purpose machinery	-0.000028	-0.000045	-58.7	Comparative disadvantage intensified	-0.988	-0.979	Import specialization improved	
17	Office, accounting and computing machinery	-0.000017	-0.000016	7.5	Comparative disadvantage improved	-0.900	-0.988	Import specialization intensified	
18	Electric motors, generators and transformers	-0.000011	-0.000018	-67.0	Comparative disadvantage intensified	-0.842	-0.974	Import specialization intensified	
19	Electronic valves, tubes, etc.	-0.000035	-0.000045	-26.5	Comparative disadvantage intensified	-0.766	-0.929	Import specialization intensified	
20	Medical, measuring, testing appliances, etc.	-0.000011	-0.000015	-34.7	Comparative disadvantage intensified	-0.949	-0.436	Import specialization improved	
21	Motor vehicles	-0.000029	-0.000035	-20.8	Comparative disadvantage intensified	-0.998	-0.997	Import specialization improved	
22	Building and repairing of ships and boats	-0.000008	-0.000011	-39.0	Comparative disadvantage intensified	-0.978	-0.547	Import specialization improved	
24	Recycling of metal waste and scrap	-0.000015	-0.000030	-99.8	Comparative disadvantage intensified	-0.642	-0.884	Import specialization intensified	

	Industry	2000	2009	Feature
01 P1	rocessed meat, fish, fruit, vegetables, fats	0.822	0.643	Intra-industry trade oriented
02 T	obacco products	0.005	0.018	Inter-industry trade oriented
03 Sj	pinning, weaving and finishing of textiles	0.023	0.014	Inter-industry trade oriented
04 W	/earing apparel, except fur apparel	0.123	0.247	Inter-industry trade oriented
05 Ta	anning, dressing and processing of leather	0.735	0.933	Intra-industry trade oriented
06 Sa	awmilling and planing of wood	0.013	0.018	Inter-industry trade oriented
07 Fi	urniture	0.527	0.536	Intra-industry trade oriented
08 Pa	aper and paper products	0.013	0.005	Inter-industry trade oriented
09 Pi	ublishing	0.016	0.011	Inter-industry trade oriented
10 C	oke oven products	0.481	0.434	Inter-industry trade oriented
11 B	asic chemicals	0.028	0.011	Inter-industry trade oriented
12 R	ubber products	0.220	0.334	Inter-industry trade oriented
13 G	lass and glass products	0.883	0.865	Intra-industry trade oriented
14 B	asic iron and steel	0.363	0.078	Inter-industry trade converted to Intra-industry trade
15 St	tructural metal products; tanks; steam enerators	0.013	0.018	Inter-industry trade oriented
16 G	eneral purpose machinery	0.012	0.021	Inter-industry trade oriented
17 O	ffice, accounting and computing machinery	0.100	0.012	Inter-industry trade oriented
18 E	lectric motors, generators and transformers	0.158	0.026	Inter-industry trade oriented
19 E	lectronic valves, tubes, etc.	0.234	0.071	Inter-industry trade oriented
20 M	ledical, measuring, testing appliances, etc.	0.051	0.564	Inter-industry trade converted to Intra-industry trade
21 M	lotor vehicles	0.002	0.003	Inter-industry trade oriented
22 B	uilding and repairing of ships and boats	0.022	0.453	Inter-industry trade oriented
24 R	ecycling of metal waste and scrap	0.358	0.116	Inter-industry trade oriented

Table 11. Trade Pattern by Sub-category of Manufacturing Industry of Myanmar

D. Vietnam

An examination of the competitiveness of the manufacturing industry of Vietnam, assessed by comparative advantage, indicates that it possesses comparative advantage or is becoming more competitive mainly in light industrial products. On the other hand, Vietnam still has comparative disadvantage in most industries, such as 'heavy and chemical industries', mechanics, 'electric products', and 'electronic products'. However, being an oil-producing country, it has a comparative advantage in the petroleum refinery ('coke oven product') sector. 'Rubber products' and 'glass and glass products' sectors are in the process of converting from comparative disadvantage to comparative advantage. Furthermore, the comparative disadvantage in the 'electric products' and 'electronic products' sector is also gradually improving (Table 12).

According to the analysis results of TSI, Vietnam shows export specialization for most industries with comparative advantage (excluding 'sawmilling and planing of wood' and 'rubber products'), and even for industries that are at a comparative disadvantage or in which comparative disadvantage is intensifying, the level of import specialization is, in part, improving (Table 12).

When examining the trade pattern of Vietnam from 2000 to 2009, there is an overall gradual increase in intra-industry trade, with the exception of 'clothing', 'tanning, dressing and processing of leather', and 'glass and glass products'. However, even in 2009, there still appeared features of inter-industry trade in many industries (recorded IIT values of less than 0.5). Inter-industry trade was dominant in light industrial products excluding 'food', 'tobacco products', and 'sawmilling and planing of wood'. Moreover, there existed inter-industry trade caused by the predominant and one-way imports of chemical products, metal products, and general machines due to Vietnam's weak production base (Table 13).

NRCA Result TSI Result Industry Growth 2009 2000 2009 2000 Feature Feature (%) 0.379 Export specialization Processed meat, fish, Comparative advantage 01 0.000454 0.000621 37.0 0.661 fruit, vegetables, fats strengthened weakened Comparative disadvantage -0.194 Import specialization improved converted to Comparative 02 Tobacco products -0.000006 0.000000 -0.782n/a advantage 03 Spinning, weaving and -0.598. Import specialization Comparative disadvantage -0.000022 0.000056 -0.760n/a converted to Comparative finishing of textiles improved advantage 0.949 Export specialization Wearing apparel, except Comparative advantage 04 0.000232 0.000609 162.1 0.624 strengthened fur apparel strengthened 0.684 Export specialization Tanning, dressing and Comparative advantage 05 0.000240 0.000365 52.1 0.538 processing of leather strengthened strengthened Comparative disadvantage Sawmilling and planing Import specialization -0.236 intensified 06 -0.000003 0.000005 converted to Comparative -0.012n/a of wood advantage 0.916 Export specialization weakened Comparative advantage 0.000014 0.000159 996.2 07 Furniture 0.952 strengthened -0.599. Import specialization Paper and paper Comparative disadvantage 08 -0.000029-0.000037 -25.5 -0.612 products intensified improved Comparative disadvantage Import specialization -0.000009-0.000016 -0.873 -0.71 09 Publishing -68.6 intensified improved Export specialization Comparative advantage 10 Coke oven products 0.000393 0.000103 -73.7 0.281 0.058 weakened weakened Comparative disadvantage Import specialization -0.783 11 Basic chemicals -0.000157 -0.000387 -146.2 -0.882 intensified improved -0.312 Import specialization Comparative disadvantage 12 Rubber products -0.000043 0.000021 -0.473converted to Comparative n/a improved advantage Comparative disadvantage 0.542 Export specialization 13 Glass and glass products -0.000035 0.000114 converted to Comparative 0.215 n/a strengthened advantage -0.769 Import specialization Comparative disadvantage 14 Basic iron and steel -0.000110-0.000192 -75.3 -0.841 intensified improved Structura metal Comparative disadvantage Import specialization 15 products; tanks; steam -0.000018-0.000023 -0.346 -24.7 -0.656 intensified improved generators 16 General purpose Comparative disadvantage Import specialization -0.000196-0.000276 -40.7 -0.890 -0.646 machinery intensified improved Export specialization Office, accounting and Comparative disadvantage -0.000050-0.000118 -134.1 17 0.422 -0.437 converted to Import computing machinery intensified specialization -0.411 Import specialization Electric motors, Comparative disadvantage -0.000067-0.000056 -0.595 18 generators and 16.7 improved improved transformers Import specialization Electronic valves, tubes, Comparative disadvantage -0.266 improved 19 -0.000206-0.000201 2.3 -0.403 etc. improved -0.262 Import specialization Medical, measuring, Comparative disadvantage 20 -0.000075-0.000099 -0.661 -31.8 testing appliances, etc. intensified improved -0.653 Import specialization Comparative disadvantage -0.000203-0.000293 21 Motor vehicles -44.3 -0.878 improved intensified Comparative disadvantage Building and repairing Import specialization 22 -0.000054-0.000093 -70.3 -0.710 -0.53 of ships and boats intensified improved Import specialization Recycling of metal Comparative disadvantage 24 -0.000035-0.000226 -537.1 -0.0390.057 converted to Export waste and scrap intensified specialization

Table 12. Competitiveness by Sub-category of Manufacturing Industry of Vietnam

	Industry	2000	2009	Feature
01	Processed meat, fish, fruit, vegetables, fats	0.339	0.621	Inter-industry trade converted to Intra-industry trade
02	Tobacco products	0.218	0.806	Inter-industry trade converted to Intra-industry trade
03	Spinning, weaving and finishing of textiles	0.240	0.402	Inter-industry trade oriented
04	Wearing apparel, except fur apparel	0.376	0.051	Inter-industry trade oriented
05	Tanning, dressing and processing of leather	0.462	0.316	Inter-industry trade oriented
06	Sawmilling and planing of wood	0.988	0.764	Intra-industry trade oriented
07	Furniture	0.048	0.084	Inter-industry trade oriented
08	Paper and paper products	0.388	0.401	Inter-industry trade oriented
09	Publishing	0.127	0.283	Inter-industry trade oriented
10	Coke oven products	0.719	0.942	Intra-industry trade oriented
11	Basic chemicals	0.118	0.217	Inter-industry trade oriented
12	Rubber products	0.527	0.688	Intra-industry trade oriented
13	Glass and glass products	0.785	0.458	Intra-industry trade oriented
14	Basic iron and steel	0.159	0.231	Inter-industry trade oriented
15	Structural metal products; tanks; steam generators	0.344	0.654	Inter-industry trade converted to Intra-industry trade
16	General purpose machinery	0.110	0.354	Inter-industry trade oriented
17	Office, accounting and computing machinery	0.578	0.563	Intra-industry trade oriented
18	Electric motors, generators and transformers	0.405	0.589	Inter-industry trade converted to Intra-industry trade
19	Electronic valves, tubes, etc.	0.597	0.734	Intra-industry trade oriented
20	Medical, measuring, testing appliances, etc.	0.339	0.738	Inter-industry trade converted to Intra-industry trade
21	Motor vehicles	0.122	0.347	Inter-industry trade oriented
22	Building and repairing of ships and boats	0.290	0.465	Inter-industry trade oriented
24	Recycling of metal waste and scrap	0.961	0.943	Intra-industry trade oriented

Table 13. Trade Pattern by Sub-category of Manufacturing Industry of Vietnam

3. OUTLOOK OF CLMV MANUFACTURING COMPETITIVENESS

3.1. Analysis Method

In this chapter, the NRCA index will be used to identify the trade competitiveness of each country. In other words, the NRCA index at different points in time (2000 and 2009) will be used in order to identify the comparative advantage from a dynamic standpoint and, furthermore, to predict future changes in the industrial structure.

Figure 2 is an illustration of the method to analyze change in dynamic comparative advantage using the NRCA values at two different time periods. When it is given that the vertical axis is the NRCA value of the base year and the horizontal axis is the NRCA value of the compared year, the combination of the NRCA values of the two points in time (base year and compared year) deduced from a specific industry (product) of a certain nation is expressed as one point in a four-sided plane of Figure 2. The area where this point is located (A-1, A-2, B, C-1, C-2 and D) represents different features as seen below:

- \checkmark A-1: industry with comparative advantage and is gradually becoming stronger
- \checkmark A-2: industry with comparative advantage, but is gradually becoming weaker
- \checkmark B: industry converted from comparative advantage to comparative disadvantage
- ✓ C-1: industry with comparative disadvantage and competitiveness is continuously
- ✓ weakening
- C-2: industry with comparative disadvantage and gradually improving competitiveness
- \checkmark D: industry converted from comparative disadvantage to comparative advantage

Figure 2. Illustration of Dynamic NCRA



In addition, the above six areas have the following structural changes:

- ✓ Industry (product) with competitiveness: A-1, A-2, D
- ✓ Industry (product) that is gradually developing: A-1, C-2, D
- ✓ Developing markets: D (current), C-2 (future)
- ✓ Declining industries: B, C-1

3.2. Result Analysis by Country

3.2.1. Cambodia

Cambodia has an industry structure focused on light industries and industries that use resources ('glass and glass products', etc.). Production and exports by industry are also concentrated in these sectors. These conditions are also consistent with the dynamic NRCA analyses. In other words, in the case of 'clothing', 'tanning, dressing, and processing of leather', and 'sawmilling and planing of wood', production and exports show sharp rises based on their comparative advantage. In addition, the industry producing 'glass and glass products' has increased its production and improved competitiveness based on Cambodia's resources and, therefore, is an industry with bright prospects for short-term and mid-term development.



Figure 3. Dynamic NRCA Analysis Results of Cambodia

To summarize and consider the dynamic NRCA analysis results and total production change by industry, it is noted that, for the time being, the industries of Cambodia will develop as they focus on light industries, particularly, 'clothing', 'tanning, dressing, and processing of leather', and 'sawmilling and planing of wood'. With further development, it is expected that Cambodia can equip itself with industrial infrastructure for 'glass and glass products' and 'rubber products', making use of its natural resources. Meanwhile, for industries such as 'general machines', 'office appliances', 'electric appliances', 'electronic appliances', 'precision devices', 'motor vehicles', and 'building and repairing of ships and boats', it is judged that there exists very low short-term or mid-term development potential due to Cambodia's weak production base.

3.2.2. Laos

Because the total production by industry for Laos was not obtained, prospects on its industrial structure will be made using the dynamic NRCA analysis results. The economy of Laos is specialized in exports of 'clothing', 'tanning, dressing and processing of leather', and 'sawmilling and planing of wood', while depending on imports for products in other industries. This is because industrial development in Laos began only recently and also because the size of the economy is very small.

Laos will aim at advancing its industrial structure in the long term by improving industrial structure that is focused on primary industries and light industries. However, due to current conditions, it is expected that Laos can specialize only in the 'clothing', 'tanning, dressing, and processing of leather', and 'sawmilling and planing of wood' industries for the time being. Aside from the above-listed industries, it is assessed that Laos has development potential in farming-based industries and industries that use its natural resources, such as 'processed food', 'rubber products', 'glass and glass products', 'basic iron and steel', and 'metal products'.



Figure 4. Dynamic NRCA Analysis Results of Laos

3.2.3. Myanmar

Like Cambodia and Laos, Myanmar has developed primary industry and light industry. However, its industrial structure depends on imports for heavy and chemical products, machines, electric appliances, electronic appliances, and automobiles and other transportation equipment. Under such industrial structures, it has achieved and is further developing competitiveness in 'food', 'clothing', 'tanning, dressing, and processing of leather', 'sawmilling and planing of wood', and 'coke oven products', but the production base for other industries is very weak.

The result of dynamic NRCA analysis shows that 'food', 'tanning, dressing, and processing of leather', and 'coke oven products' are the promising industries for present and the future growth. The 'sawmilling and planing of wood' and 'clothing' industries are weakening in terms of their comparative advantage. However, they still have global competitiveness and are acting as the backbone of Myanmar's economic growth. An industry that is worth taking notice of amid the change of Myanmar's industrial structure is the petroleum refinery ('coke oven products') industry. In 2000, it showed that it relied heavily on imports, but, with the establishment of a production infrastructure for this industry, it has progressed by substituting imports and increasing exports.



Figure 5. Dynamic NRCA Analysis Results of Myanmar

3.2.4. Vietnam

Vietnam is a country that has achieved rapid development as it increased total production on a yearly average of 27.0% from 1998 to 2008. Due to the effects of the reform and liberalization policy begun in 1986 and extending into the 1990s, it has made great strides in the light industries sector. Coming into the 2000s, Vietnam is showing rapid growth in the heavy and chemical industries, machines, electric appliances, electronic appliances, and automobile and other transport equipment

industries. From 1998 to 2008, industries that recorded higher growth rates than the entire nation's annual average total production growth rate (27.0%) were 'furniture' (54.1%), 'building and repairing of ships and boats' (51.8%), 'motor vehicles' (38.1%), 'structural metal products' (37.8%), 'medical, measuring, testing appliances, etc' (36.9%), 'sawmilling and planing of wood' (34.3%), electric products ('electric motors, generators, and transformers', 33.4%), 'rubber products' (31.1%), 'clothing' (29.4%), 'basic iron and steel' (27.7%), and 'food' (27.2%).

Results of the dynamic NRCA analysis showed that 'food', 'textiles', 'clothing', 'tanning, dressing, and processing of leather', 'sawmilling and planing of wood', 'furniture', and 'glass and glass products' are strengthening their comparative advantage or have newly achieved comparative advantage and, thus, have high growth potential for the future. In particular, 'food', 'clothing', 'tanning, dressing, and processing of leather', and 'sawmilling and planing of wood' are expected to achieve continued growth by utilizing agricultural products and resources, and the cheap labor pool of Vietnam. 'Textiles', 'sawmilling and planing of wood' and 'glass and glass products' have become Vietnam's new growth industries based on their improved competitiveness. Thus, their future development prospects are bright. Tobacco products and rubber products are industries that have been converted from comparative disadvantage to comparative advantage, but the level of comparative advantage is still low. It appears that there is little possibility that these industries will be developed in the short term. The electric products ('electric motors, generators and transformers') and electronic products industries have recently made great improvements from their comparative disadvantage (C-2). In particular, it is expected that the rapid increase of production achieved in the electric products sector will continue to improve

competitiveness of that industry as well as increase exports.



Figure 6. Dynamic NRCA Analysis Results of Vietnam

4. IMPLICATIONS AND RECOMMENDATIONS FOR KOREA AND CLMV

The structural changes in the manufacturing industries of CLMV countries can be summarized as reduced emphasis on labor-intensive industries and increased emphasis on higher value-added industries. Although there are some difficulties and differences from country to country, for the most part, labor-intensive industries, such as processed foods, textiles, and clothing were dominant. However, due to the advancement of industrialization, the share of high value-added industries has recently been on the rise. In particular, Vietnam, which has achieved significant economic growth since the 1990s, displays relatively rapid progress in terms of industrial structure such as 'furniture', 'structural metal products', and 'building and repairing of ships and boats'.

Additionally, in the competitiveness analysis by industry via the NRCA, all CLMV countries show comparative advantage in the clothing and wood product sectors. Other industries that show comparative advantage or have converted to comparative advantage are 'tanning, dressing, and processing of leather' and 'glass and glass products' for Cambodia, 'food' and 'basic iron and steel' for Laos, 'food', 'tanning, dressing, and processing of leather', and 'coke oven products' for Myanmar, and 'food', 'tobacco products', 'tanning, dressing, and processing of leather', 'textiles', 'furniture', 'rubber products', 'glass products', and 'coke oven products' for Vietnam. Export specialization is also evident in similar industries in the trade specialization analysis using TSI. However, Myanmar appeared to be specialized in 'glass and glass products' as well, while Vietnam was not specialized in wood and rubber products although it has comparative advantage. In trade pattern analysis using IIT, the CLM countries were still at the inter-industry trade level for most industries. However, 'rubber products' and 'glass and glass products' for Cambodia, 'food', 'tanning, dressing, and processing of leather', and 'basic iron and steel' for Laos, and 'food', 'tanning, dressing, and processing of leather', 'basic iron and steel', 'furniture', 'glass and glass products' for Myanmar are showing intra-industry trade characteristics. Meanwhile, in the case of Vietnam, with the exception of 'clothing' and 'tanning, dressing, and processing of leather', most industries are strengthening the level of intra-industry trade, while 'food', 'tobacco products', 'coke oven products', 'electric valves/tubes', 'medical/optical devices', and other manufacturing industries are already showing high levels of intra-industry trade.

When forecasting the industrial structure of CLMV using the dynamic NRCA

analysis, Cambodia's industry is expected to mainly develop its light industries, particularly 'clothing', 'tanning, dressing, and processing of leather', and 'wood products', for the present. At the same time, Cambodia is also creating a basis for 'glass and glass products', 'rubber products', and 'structural metal products' by utilizing its natural resources. Laos is expected to mainly develop its 'clothing', 'tanning, dressing, and processing of leather', and 'wood products' industries as well. Moreover, the development prospects for industries utilizing its natural resources and farming infrastructure are also bright. Myanmar is expected to develop its 'food', 'tanning, dressing, and processing of leather', and 'coke oven product' industries, while it is also expected that its 'wood products' and 'clothing' industries will grow. In Vietnam, based on its rapid economic growth and increased FDI, it is expected that its 'food', 'textiles', 'clothing', 'tanning, dressing, and processing of leather', 'wood products', 'furniture', 'glass and glass products', 'electric products', and 'electronic products' will be further developed. It is expected that Vietnam will play a key role in the global production network of East Asia in most industries with the exception of the 'clothing' and 'furniture' industries.

The following points can be obtained from these analyses. First, CLMV countries must establish and enforce industrial development strategies or industrial structure adjustment policies focusing on the industries mentioned above in these analyses. Secondly, the utilization of resources, growth potential, and advantages of the CLMV countries must be maximized in order to foster new growth industries. Third, taking into account that the role of FDI is important in the CLMV region's industrial development and structural changes, CLMV countries should improve their foreign investment environment and try harder to attract more FDI. In particular, due to the

recent growth of the China risk, there is an increasing number of foreign companies leaving China and countries such as Korea and Japan are looking for regions to offset the China risk. At this point, the CLMV region should take full advantage of such opportunities. From this viewpoint, the recent rapid wage hikes of some nations, including Vietnam, is of increasing concern. Fourth, there is a need to advance the industrial structure in the mid-term and long-term. To achieve this, a strategy must be established that can allow CLMV to participate in the East Asian production network that is currently being constructed, or make use of it. Lastly, major investors such as Korea, Japan, and China should provide active support for the industrial readjustment of CLMV countries. To this end, proper policies should be suggested to support overseas investment in the CLMV region to accelerate the integration of Vietnam and other countries into the regional production network and increase human resource exchanges and technological transfers to support advancement of the industrial structure.

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