

## **The Nature of Newly Developed Industrial Activities in**

### **Myanmar: A Case Study of Industrial Zones**

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#### **Abstract**

Different types of industry demand different locational advantage. Spatial variations of industrial development and industrial specialization have, therefore, occurred on the earth's surface. In Myanmar, the most spatially distinguished effort for industrial development is establishment of industrial zones since 1989. This paper tries to trace the spatial variations on the nature of newly developed industrial activities from the case study of those industrial zones and tries to explain the underlying factors that generate above variations. Analysis is focused on industrial development and industrial specialization and conducted at two levels: national level; and regional level. The results show that development of the industrial zones is closely related to their respective advantageous location. Therefore, the industrial policy should favour the advantages of each industrial zone to be able to accelerate the industrial development.

**Key Words:** industrial development, industrial specialization, location factors, spatial variation

#### **Introduction**

Different types of industry demand different locational advantage. Spatial variations of industrial development and industrial specialization have, therefore, occurred on the Earth's surface. Since Myanmar has

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changed its economic system from socialist to market oriented system in 1988, many efforts have been made to obtain its industrial development. Private sector industrial development was reinforced in many aspects by enacting laws and regulations. The most spatially distinguished effort in industrial development is establishment of industrial zones since 1989. The main purposes for the establishment of industrial zones are: (1) Regrouping the industries which were scattering in the country, (2) Developing the private industries, (3) Establishing the import substitute industries, (4) Developing the nation's technological sector to reach the international level (Aung- Set Hmu, 2001). With the above purposes eighteen industrial zones were established during 1989 to 2000. Of them, four industrial zones are located in Yangon and others are distributed in the regional capitals or large towns. Not only existing industries are relocated in the industrial zones but also newly established industrial activities are insisted to locate in the industrial zones. Therefore, this study emphasized these industrial zones to trace the nature of newly developed industrial activities in Myanmar.

### **Problem**

This study focuses on two dimensions of industrial activities: *development* and *specialization*. Although the established years of industrial zones are varied, above two dimensions will be different among the industrial zones of Myanmar. Therefore, this study tries to solve the following questions: (1) How does industrial development differ among the industrial zones in Myanmar? (2) What kinds of industrial specialization have occurred in the different industrial zones? (3) What are the factors that have been generating above spatial variations of industrial development and industrial specialization? If we clearly know the different nature of industrial development and the factors influencing the development of industrial specialization in each industrial zone,

conceptual knowledge can be used in the future industrial development planning.

### Materials and Methods

To make clear the spatial variations of industrial development and industrial specialization, data related to the number of establishment, number of worker, amount of capital investment having in each industrial zone were collected from Ministry of Industry No. (1). Even though value-added is one of the valuable representative indicators of industrial development, it was omitted in this study due to unavailability of data. By using those data, *comparative analysis* and *cluster analysis* were conducted to generalize the spatial variation of the industrial development and industrial specialization. To be able to explain the relationship between spatial variation of industrial activities and locational factors more specifically, industrial zones located in Yangon City were also analyzed. In this case, data were derived from the respective industrial zone management committee.

The distribution pattern of industrial zones is described in the following section. The fourth section analyzes the spatial variation of industrial development and industrial specialization among industrial zones in Myanmar. Then, industrial zones located in Yangon are focused in order to explain more effectively the relationships between industrial specialization and locational factors of industrial zones. The findings, weaknesses and implication of the results of this study are discussed in the conclusion.

### Distribution of industrial zones in Myanmar

Myanma industrial activities can be broadly divided into three major groups, namely, state-owned sector, co-operatives sector, and private sector based on their possessive conditions State-owned industrial

activities are mainly conducted under the Ministry of Industry No. (1) and No. (2). Ministry of Industry No. (1) is concerned with the production of basic products (food, clothing, shelter which are essential for the people) while Ministry of Industry No. (2) is related to production of heavy industries. Some other state-owned industries are belonged to functionally related ministries.

Industrial co-operative activities are belonged to Ministry of Co-operative and distributed throughout Myanmar. Private industrial activities are distributed throughout the country, especially, in Mandalay, Ayeyarwady, Yangon and Bago Divisions in terms of establishment number<sup>1</sup>. In 1996-97, state-owned sector occupied 3.06% of all industrial establishments and co-operative and private sectors accounted for 1.22% and 95.72%, respectively. With the increasing investment in industrial sector, it became necessary to relocate industrial activities into specified areas to be able to manipulate environmental problems and to get development through the co-location of industrial activities. Therefore, eighteen industrial zones were established throughout Myanmar since 1989 (see Fig. 1).

From Fig. 1, it can be seen that most of the industrial zones are located in Yangon and other regional capitals. Distribution of industrial zones shows that they can be organized into industrial regions. For example, Yangon industrial zones and Bago industrial zone are closely located. From their locations it can be formed as a national industrial region and will play an important role in the industrial development of Myanmar. In addition, Mandalay, Meikhtila and Myingyan industrial zones can be formed as a secondary national industrial region. Monywa industrial zone is also located at the strategic trading point between India and Myanmar. Industrial zones located in the Ayeyarwady delta will have a potential to exploit the agro-based industrial activities while Myeik

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industrial zone has a favourable condition for the development of marine product related industries.

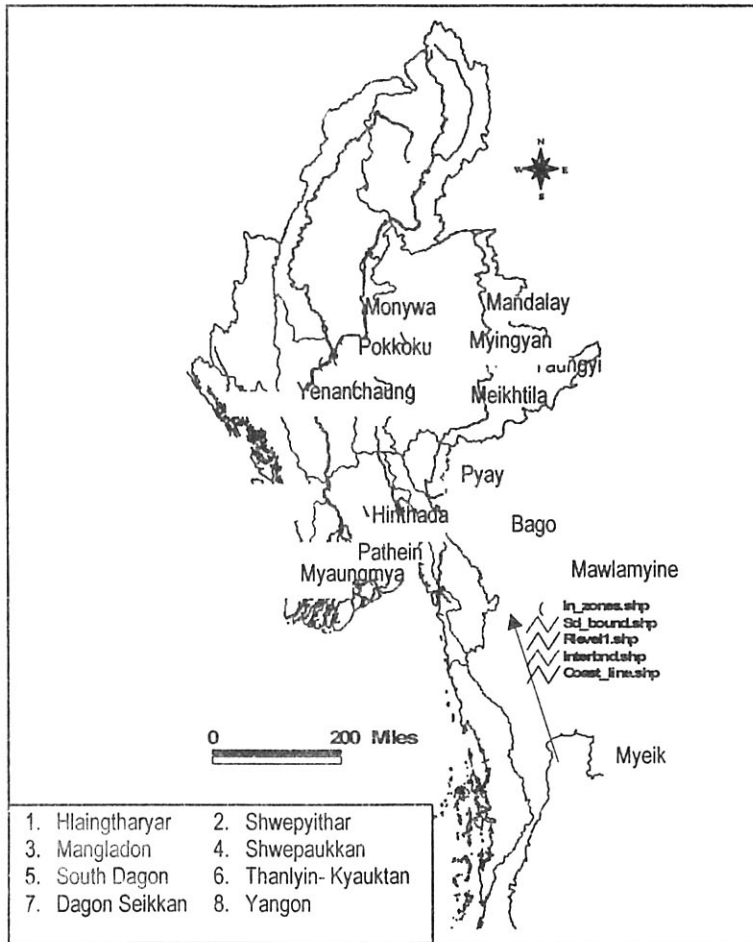


Figure 1 Spatial distribution of industrial zones in Myanmar

Notes: 1. Industrial zones located in Yangon are officially divided into Eastern, Western, Northern and Southern industrial zones and counted as four industrial zones.

## The spatial variation of industrial development and industrial specialization

Development of an industrial zone is evaluated based on many indices like, number of establishment, number of worker, capital investment, and value added of the industrial zone.

### Spatial variation of industrial development

Fig. 2 shows the distribution of above indices except value added which is not available. It is clear that although industrial zones are distributed through out the country, industrial activities are generally concentrated around Yangon and Mandalay. Hinthada, Patheingyi and Myaungmya industrial zones are located near the Yangon industrial zones. On the other hand, Monywa, Taunggyi industrial zones are closely located to Mandalay industrial zone. All industrial zones, except Yangon and Mandalay have very small amount of development in terms of other two indices (number of worker and capital investment).

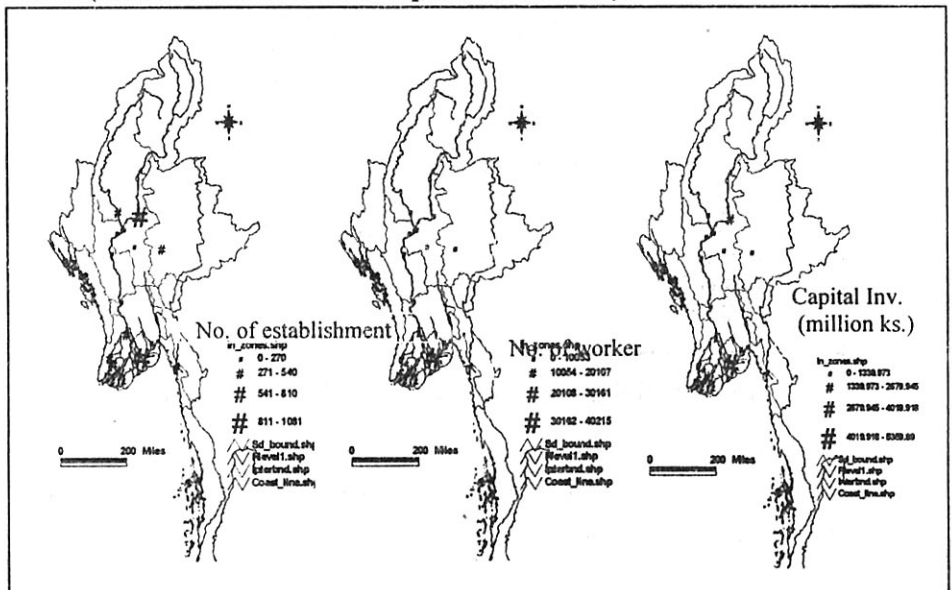


Figure 2. Number of establishment, number of worker and total amount of capital investment in each industrial zone in Myanmar

- Notes:
1. Bago industrial zone is excluded in this calculation due to data difficulty
  2. Yangon Includes the industrial zones of Shwepyitha, Hlaingtharyar, Shwepaukkan, South Dagon, Dagon Seikkan, and Mangaladon.

Source: Ministry of Industry No. (1) September, 2002.

Table 1 shows the average factory size in terms of number of worker and capital investment. Myeik industrial zone has seven marine-product-related factories with large amount of capital investment and worker. Yangon industrial zones have relatively many large factories. In the Mandalay industrial region, Mandalay, Myingyan, and Meikhtila industrial zones have medium size factories in terms of capital investment per factory. However, they are small in terms of number of worker per factory. Other industrial zones located in Ayeyarwady Delta and Central Myanmar have relatively small size factories.

Table 1. Average size of factory in each industrial zone

Industrial Zone	Worker per factory	Capital inv. per factory (,000ks.)
Mandalay	7.9	143.5
Myingyan	6.6	151.9
Yangon	45.6	517.4
Meikhtila	5.7	116.6
Myaungmya	6.4	38.6
Hinthada	4.9	32.2
Mawlamyine	4.1	39.5
Monywa	5.9	97.5
Taungyi	4.2	27.9
Yenanchaung	6.4	23.4
Pathein	7.4	63.8
Myeik	32.4	3150.4

Industrial Zone	Worker per factory	Capital inv. per factory (,000ks.)
Pyay	3.1	112.9
Pakkoku	4.0	50.2
Average	10.3	326.1

Source: Ministry of Industry (1), September, 2002

In general, it can be said that only Yangon and Mandalay Industrial zones have relatively high level of industrial development with relatively large factories. Those variations of industrial development are related to the location of industrial zones and their economic environments. Yangon is a capital of the nation and has many foreign and local industrial investments. Many export oriented industrial activities are located in Yangon. On the other hand, Mandalay is former national capital and located far distance from Yangon. Therefore, it has wider hinterland that gives good potential for procurement of raw material and distribution of finished product (market area) in upper Myanmar. It is also located in a strategic location for processing of local raw materials and exporting of finished products to China and India through border trade.

### **Spatial variation of industrial specialization**

Myanmar has many natural and socio-economic regions with different geographical characteristics. From the points of industrialist it is more meaningful to take the advantage of this differentiation in consideration of their plant location. This assumption is even more effective in developing countries like Myanmar where industry is based on agriculture produces, having many small and medium size enterprises, with the developing stage of transportation. This section analyzes the spatial variation of specialization of industrial zones by using cluster analysis.



Data used in the cluster analysis were derived from Ministry of Industry No. (1) and it was classified into thirteen industrial categories. All industrial zones located in Yangon (Shwepyithar, Hlaingtharyar, Shwepaukkan, South Dagon, Dagon Seikkan, Mingladon) were combined in terms of one industrial zone. In addition, Bago industrial zone was excluded from the analysis due to lack of data. As a consequence, only fourteen industrial zones and thirteen industrial types were left for the analysis.

First, the types of industry include in each industrial zone were changed to percentage distribution. For example, Myingyan industrial zone has 185 total establishments. Of them, construction material industries accounted for 22 establishments. This actual number of establishment occupied by each industrial type was transformed into percentage. In above example, construction material industries accounted for 12 percents. Such percentage distributions of each industrial type in each industrial zone were used as the classified variables.

Cluster analysis of *Ward's method* and *Equal-euclidean distance* was used to classify the industrial zones in terms of specialization. Four clusters with different industrial specialization were resulted. The distribution of the clusters and their characteristics are shown in Fig. 3, Fig. 4 and Fig. 5. First cluster includes Pathein, Hinthada, Myaungmya, Myeik, and Pokkoku industrial zones. From Fig. 4 it can be seen that those zones are specialized in food and beverage industries. However, there are some variations within that cluster. Myeik industrial zone, for example, emphasizes on the processing of marine products while Pathein, Myaungmya and Hinthada zones are specialized in farm produces like rice. On the other hand, location of Pakkoku industrial zone favours for the development industries based on *Ya* and *Kai* produces of the region.

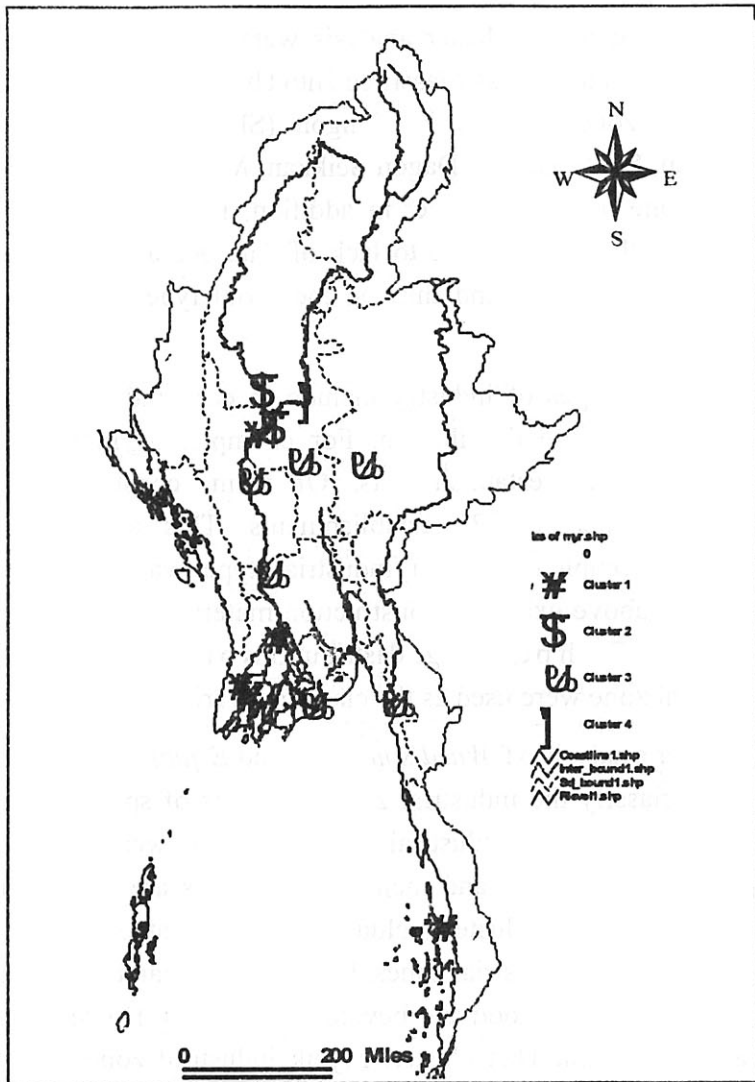


Figure 3 Distribution of four clusters

Cluster 2 includes Myingyan and Monywa industrial zones and specialized in the industrial raw materials, and food and beverage industries. Since those two industrial zones are located in the central zone of Myanmar, it is a good place to process industrial raw material (esp, textile and leather) before proceeding to the market. In addition, some motor vehicle repair workshops are also found there.

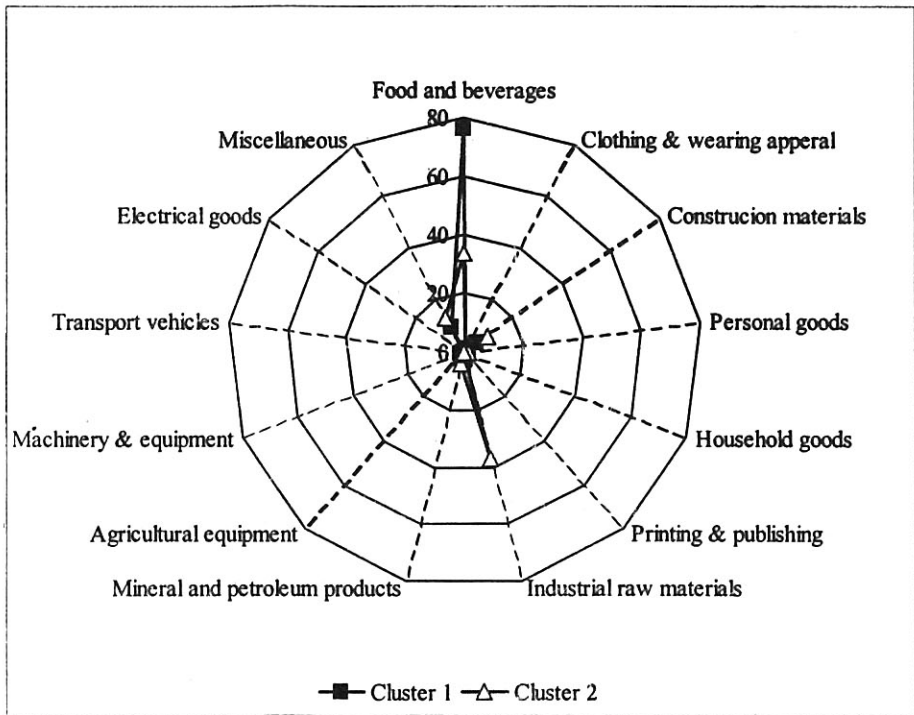


Figure 4 Nature of industrial specialization in cluster 1 and cluster 2

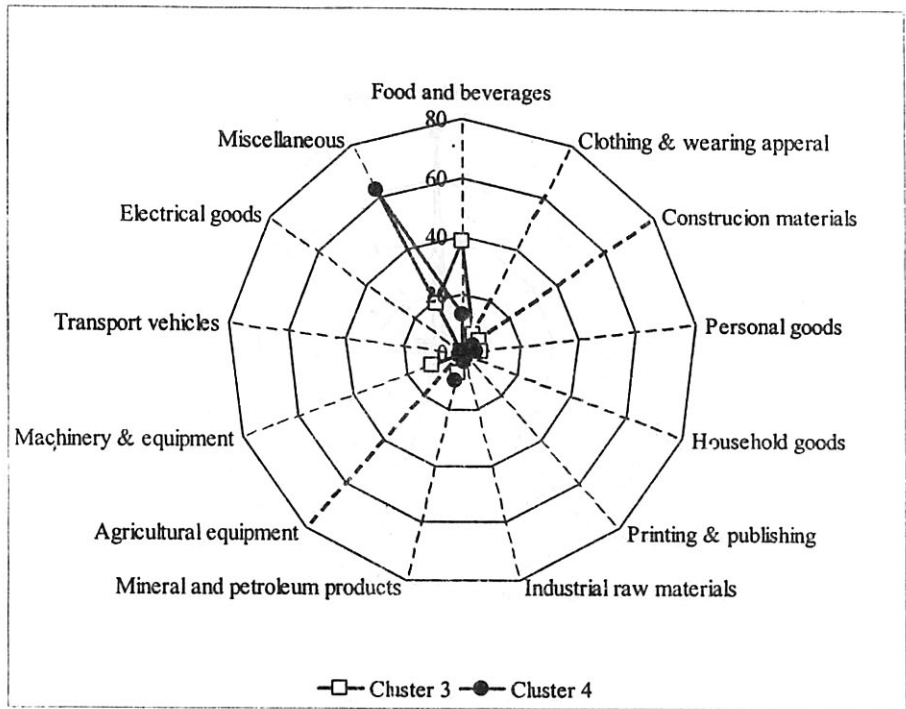


Figure 5 Nature of industrial specialization in cluster 3 and cluster 4

Third cluster composed of Taungyi, Mawlamyine, Yenanchaung, Meikhtila, Pyay and Yangon industrial zones. Those industrial zones have balance structure of industrial specialization. These industrial zones are located in regional capitals or major towns. Since those cities have very wide hinterland areas, they have to process variety of goods to be able to support their hinterlands sufficiently.

The fourth cluster includes Mandalay industrial zone. Miscellaneous industries, especially, motor vehicle repair workshop and small iron works are predominant in this industrial zone. Actually, a part of Mandalay industrial zone was initially established by the relocation of iron and steel industries of Seinpan Ward, Mandalay. In addition, Mandalay is the second largest city of Myanmar and has had very large hinterland. Road is major mode of transportation in the region. Many highway routes are

crossing through Mandalay. As a result, many industrial works related to repair of motor vehicles are developed there.

In general, it can be said that the industrial zones including in the cluster 3 are *multi-product industrial zones* and the industrial zone including in the other clusters are *specialized-product industrial zones*. Development pattern of these industrial zones also reveals that they are closely related to their location factors.

### Industrial zones in Yangon

There are 8 industrial zones in satellite towns of Yangon. Some industrial zones like Hlaingtharyar, Dagon Seikkan, and Mingladon were designed to include recreational facilities (DHSHD, 2000) (see Table 2). In addition to above industrial zones, there are some industrial areas established in the periphery of Yangon City (like North Okkalapa) and industrial agglomerate located in Pyinmabin area, Mingladon Township. Those areas were, however, excluded from the study.

Table 2. Industrial zones in Yangon (October, 2002)

No.	Industrial zone	Date of Est.	Area (Acre)	No. of Plant*	No. of worker	No. of Worker/plant
1	Shwepyithar	1989	887.84	152	18350	121
2	Mangaladon	1990	222.40	5	1984	397
3	Shwepaukkan	1992	94.64	125	4801	38
4	Hlaingtharyar	1994	1300.00	366	40630	111
5	South Dagon	1994	689.06	1037	13735	13
6	Thanlyin- Kyauktan	1996	432.60	-	-	-
7	Dagon Seikkan	1997	1208.70	39	4432	114
8	Yangon	1999	U/C	U/C	U/C	U/C

Notes: \* Plant that actually running; 1. U/C means under construction; 2. In case of Hlaingtharyar, zone (5) is not included

Sources: Industrial zone management committee of respective industrial zone.

Shwepyithar industrial zone is the earliest industrial zone constructed in Yangon. Of the industrial zones in Yangon, some industrial zones like Hlaingtharyar industrial zone were constructed by Department of Human Settlement and Housing Development (DHSHD). However, some industrial zones like Thanlyin-Kyauktan and Mingladon industrial zones were constructed by the joint venture company established between DHSHD and foreign companies. Other industrial zones like Yangon industrial zone is being jointly constructed by DHSHD and Myanmar private company.

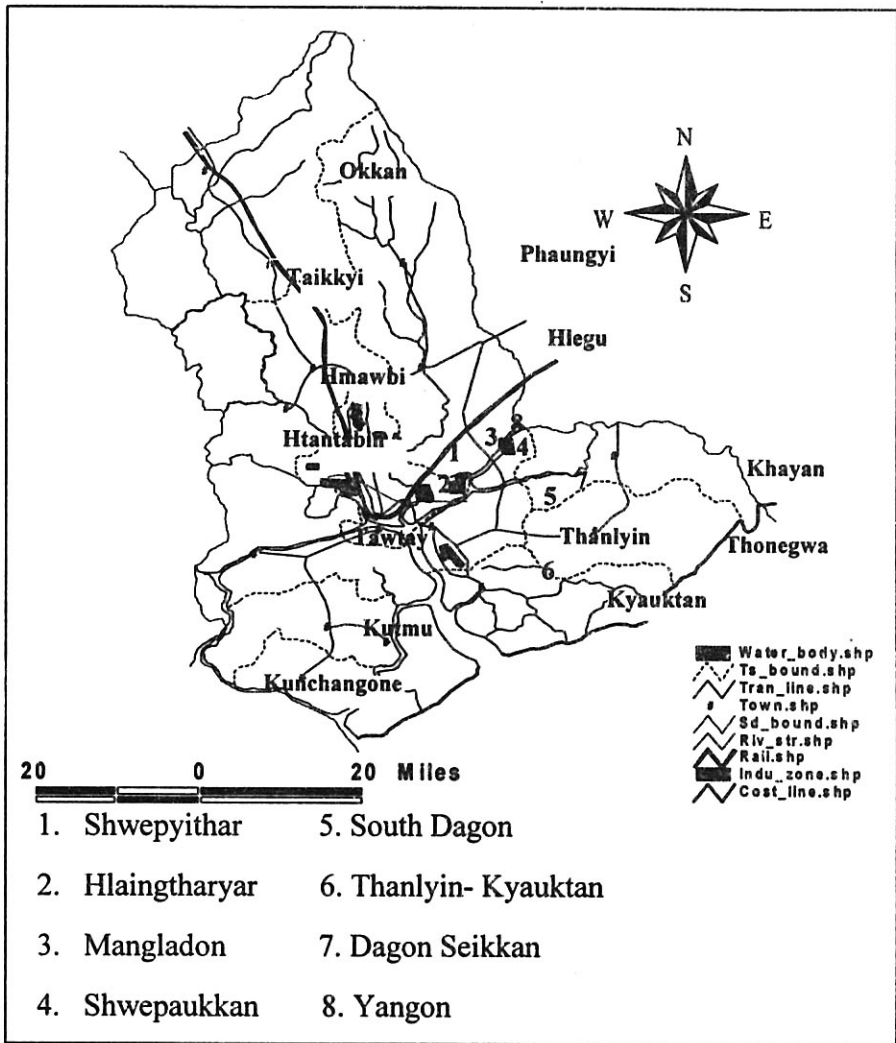


Figure 6 Distribution of industrial zones in Yangon City

Distribution of industrial zones in Yangon is shown in Fig. 6. Generally, industrial zones are located in circular shape (except southwestern parts) in the periphery of Yangon city. They are also located beside the major transportation routes. For instance, Hlaingtharyar industrial zone is located beside the Yangon-Pathein Highway (Highway No. 5) and Dagon Seikkan industrial zone is located on the bank of Bago River. Such location factors can generate advantages or disadvantages for

the development (as shown in Table 2) of industry and industrial specialization. In other words, the development of industrial zones can be influenced by those geographical factors in long-term.

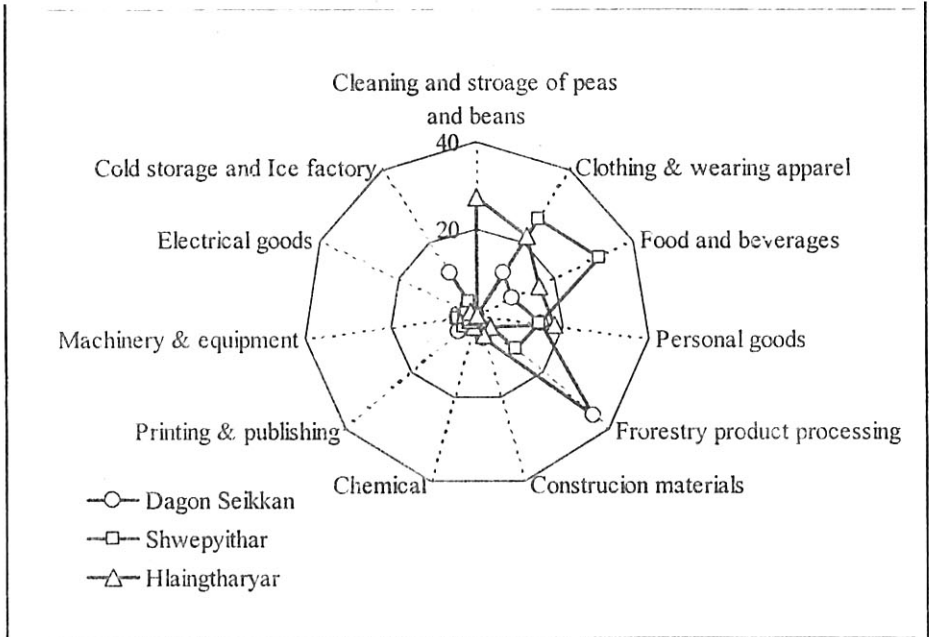


Figure 7 Percentage distributions of industrial types in Dagon Seikkan, Shwepyithar, and Hlaingtharyar industrial zones (October, 2002)

Sources: Respective industrial zone management committee offices.

Note: Data related to zone No. 5 of Hlaingtharyar industrial zone is not included in the calculation.

Percentages of each industrial type in each industrial zone were calculated to define the industrial specialization (Fig. 7). Since types of industrial classification used by each industrial zone are different, this paper is concerned with industrial classification type used in Hlaingtharyar industrial zone as basic classification. Then, industrial types of other zones



were reclassified, based on it. Percentages of type of industries located in each industrial zone are different.

As shown in Fig. 7 and Fig. 8, each industrial zone has almost all industrial types. However, individual case varies. For instance, Hlaingtharyar industrial zone has higher percentage of peas and beans cleaning and storage warehouses and cloth and wearing apparel industries while Shwepyithar has higher percentage of food and beverage industries and cloth and wearing apparel industries. On the other hand, Dagon Seikkan industrial zone emphasizes on wood-based products, personal goods industries and cloth and wearing apparel industries. As shown in Fig. 8, South Dagon industrial zone emphasizes on machinery and equipment production. Shwepaukkan industrial zone has many personal goods and food processing factories. Such variation in the spatial distribution of industrial activities among industrial zones seems to be related to the locational factors, such as availability of good and abundant ground water supply, transportation facilities, market vicinity, and influences of industrial policies of each industrial zone.

Hlaingtharyar industrial zone is located beside the Yangon-Pathein Highway which is the main road transportation linkage between Ayeyarwady Division and the national capital. It is also located near Bayinnaung Market which is the largest farm and marine produces wholesale area in Myanmar. Therefore, Hlaingtharyar industrial zone has a favorable location for development of many peas and beans cleaning industries and warehouse to store such cleaned products. In addition, its nearness to Yangon City and good transportation attract the labor force from both local area and Yangon City. As a result, garment factories that need large number of workers are developed there.

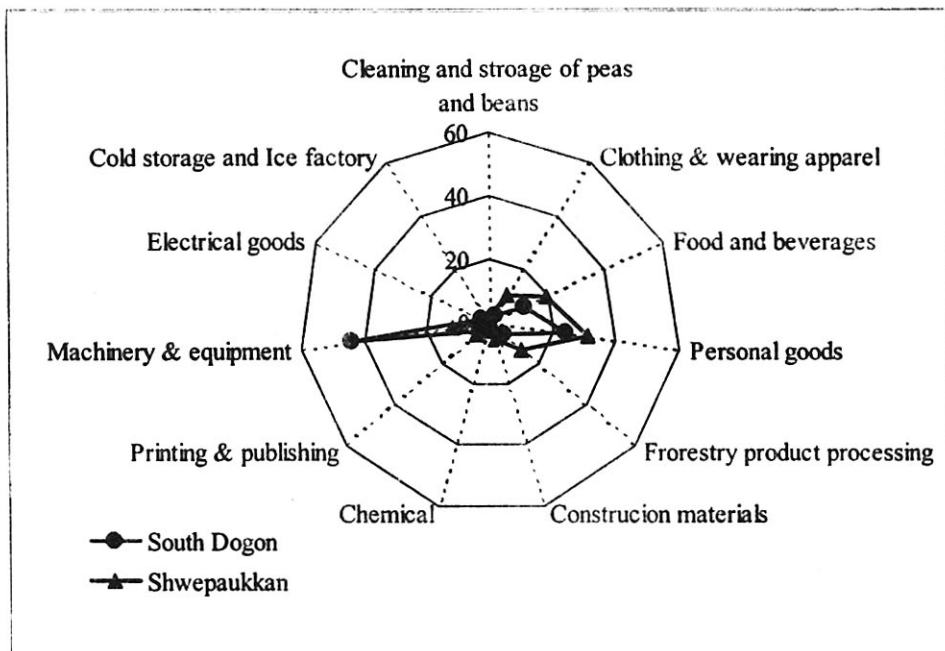


Figure 8 Percentage distribution of industrial types in South Dagon and Shwepaukkan industrial zones (October, 2002)

Sources: Respective industrial zone management committee offices.

Shwepyithar industrial zone can absorb the reserve labor force (especially family member of Tatmadaw men) from the nearby military bases and its local area. This factor favours to garment factories development. Moreover, Shwepyithar industrial zone provides abundant and good quality underground water for foodstuff and beverage industries. As a consequence, many food processing industries like brewing industries, marine product processing factories and drinking water production factories are located there. From its location, both raw material and finished products can be easily transported from and to the whole Myanmar through highway No. (4).

Dagon Seikkan industrial zone located on the bank of Bago River has good water-way accessibility. It can also be connected with the whole

country by means of highway No. (2). In addition, Yangon-Thanyin Bridge No. (2), which is under construction, will double its accessibility, since finished products can be shipped to the foreign countries through Thilawa Port. Therefore, wood-based products, especially high class furniture and timber production factories, are located there.

Although machinery and parts productions are mainly found in South Dagon industrial zone, those are small factories having two or three workers. Most of the industrial plants (especially zone 3) were relocated from Kyettan (Pazundaung Township) and Tamwe (Tamwe Township) areas. Higher percentages of personal goods and food-stuff productions are found in Shwepaukkan industrial zones, especially domestic market-oriented industries like plastic works, various kinds of jams, fish-pastes and fish-sauce productions. Mingladon industrial zone which is not included in the Fig. 7 and Fig. 8 has five running garment factories. All these factories are owned by foreign companies.

Generally, it can be said that there are differences in specialization of industrial zones located in Yangon based on their locational advantages.

### **Result and Findings**

This study analyzes the spatial variation of industrial development and industrial specialization based on the recently developed industrial zones in Myanmar. It is focused on two levels: national (all industrial zones) and regional (Yangon industrial zones). The finding of this study can be summarized as follows:

- (1) There are spatial variations in terms of industrial development. Industrial zones located in the Yangon and Mandalay have relatively large amount of establishment number, industrial worker, and capital investment.
- (2) There are spatial variations in specialization of industrial zones. Some industrial zones located in regional capitals

and large towns like Taungyi, Mawlamyine, Yenanchaung, Meikhtila, Pyay and Yangon (cluster 3) have balance industrial structure while others have specialized nature. <sup>1</sup>

- (3) Detail analysis of industrial zones located in Yangon also shows that there are spatial variations of industrial specialization related to the locational advantages of each industrial zone.

### **Discussion and Conclusion**

This paper analyzes the nature of newly developed industrial activities from the reference of recently established industrial zones. It is focused on two points: spatial variation of industrial development and industrial specialization. Data used in this study have derived from two main sources. To analyze the industrial zone at the national level, data are collected from Ministry of Industry (1). At the regional level, Yangon industrial zones are analyzed based on the data derived from each industrial zone management committees. Although there are differences between two data sources and type of data, it has no effect on the results since each analysis use only one data source and one data type.

This paper pointed out the spatial variation of industrial development and industrial specialization based on the locational characteristics of each industrial zone. Different industry needs different nature of locational advantage. At the national level, industrialist will not build a textile based industry (industrial raw material) in Myeik industrial zone where no raw material is available. Similarly, it is impossible to locate marine product processing factory in Myingyan industrial zone. At the regional level, it will be very costly for a marine product processing factory to locate at the South Dagon industrial zone where abundant high quality water and water transport is not available. Dagon Seikkan industrial zone possesses locational advantages related to raw material

procurement (Bago River and No.(2) Highway), labor availability (Yuzana Garden City) and finished product marketing (Yangon and Thilawa Ports) of wood-based export oriented factories. Therefore, it is reasonable that wood-based industries are specialized there.

Long-term development of an industrial zone is impossible without the help of proper industrial planning and training programs. In addition, this industrial planning and training program must be adopted in accordance with the situations of each industrial zone. For example, it is more meaningful to construct a wood-based processing training school at the Dagon Seikkan industrial zone than construction of it at the Shwepyitha industrial zone. Although this study could mention general conditions of industrial zones, detail studies are required before implementing development policies for each industrial zone.

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