An Analytical Study on Spatial Distribution Pattern of Cottage Industries in Mawlamyine City, Mon State

Khine Khine Win*, Aung Nandar Htun, Hla Myitzu***, Phyu Zin Ei****, Mar Mar Htwe*****

Abstract

Mawlamyine City is the Capital of Mon State and comprises of 29 Wards. It lies at the coordinate between 16º 24' to 16º31' North latitudes and between 97º 36' to 97º 40' East longitudes. At present, the total area of Mawlamyine City is 26,388 acres (or) 41.23 sq.mile (or) 106.79 sqkm. In 2019, the total population of Mawlamyine City is 232,073 persons. Many types of cottage industries such as construction material industry, food and beverage industry, consumer goods industry, clothing and wearing industry and miscellaneous industry are found in this area. Population of the study area also supports work force to the cottage industries and the area easily accessible within Mawlamyine Township. The distribution pattern of cottage industries is studied by using the Average Nearest Neighbor Analysis method with the three types of patterns, cluster, random and dispersed pattern, of which cluster pattern is the most distribution pattern of the cottage industries. Generally, most of the cottage industries are clustered in western part of the city, particularly, most urbanized area having highest accessibility area of the city. Transportation, raw material, available market demand and electric power are the major affecting factors on the distribution pattern of cottage industries in Mawlamyine city.

Keywords: Spatial, Cottage, Pattern, Average Nearest Neighbor Analysis

Introduction

This research presents an Analytical Study on Spatial Distribution Pattern of Cottage Industries in Mawlamyine City, Mon state. In the study area, many types of cottage industries are existed unevenly distributed pattern. Existed cottage industries are provided jobs and income to the people living in this area.

Study Area

The city is located in Mawlamyine District , within Mon State. Geographically, Mawlamyine is bounded by Hpa-an and Paung in the north, Mudon Township in the south, Kyaikmaraw Township in the east and Chaungzon Township and Thanlwin River in the west. The area of the city is 106.79 square kilometer (41.23 sq miles) and consists of 29 wards.

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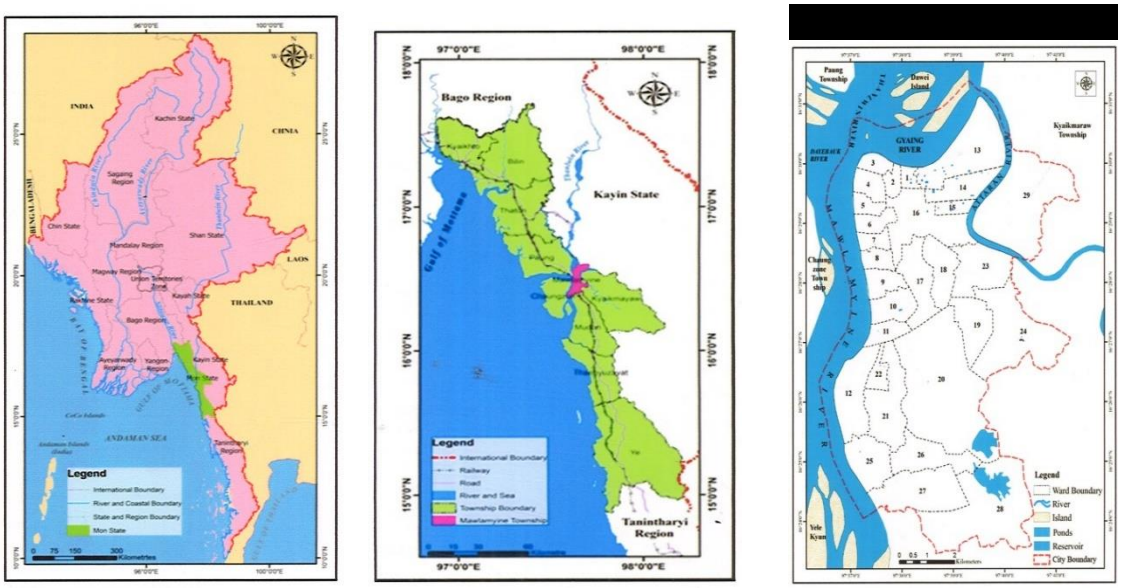

Figure – 1 Location of Mawlamyine City

Source: Myanmar Survey Department, Land Survey and Land Record Department

Research Question

What are the factors affecting on the spatial distribution of cottage industries in Mawlamyine City?

Aim

The main aim of this research is to analyze the spatial distribution pattern of cottage industries in Mawlamyine City from a geographical point of view.

Objectives

The main objectives of the research are:

- To identify various types of cottage industries in the study area,
- To study the significance and different distribution of cottage industries in the study area,
- To investigate supporting factors for development of cottage industries,
- To predict future prospect of cottage industries in the study area.

Source of Data and Research Methodology

Primary data were collected by field survery, questionaries and interviews. The secondary data are collected from Mawlamyine Township Small-Scale Industry Department.

The distribution of cottage industries are presented by dot method. The distribution patterns are examined by average nearest neighbor analysis. To present the paper, SWOT analysis was applied.

Types of Cottage Industries in Mawlamyine City

There are different categories of goods production from the cottage indsutry of Mawlamyine City. In the study area, the cottage industries can be divided into five types and subdivided into 29 types. Among them, 13 industries are registered and non-registered cottage industries are 16 types. The major types of cottage industries may be classified as follows: (1)

construction material industry, (2). food and beverage industry, (3) consumer goods industry (4) clothing and wearing industry, (5) miscellaneous industry. Mawlamyine City has about 221 cottage industries.

Table - 1 Types of Cottage Industry in Wards of Mawlamyine City (2019)

No	Wards	Types of cottage Industry					Total
		Construction Material Industry	Food and Beverage Industry	Consumer Goods Industry	Cloths and Wearing Industry	Miscellaneous Industry	
1	Kyaikpane	-	1	-	-	2	3
2	Aukkyin	5	1	-	1	-	7
3	Mandalay	1	2	-	-	2	5
4	Hepttan	10	1	-	-	7	18
5	Shwedaung	-	3	-	-	2	5
6	Sikkegone	4	3	-	-	1	8
7	Mayangone	1	-	-	-	-	1
8	Pebedan	6	1	-	-	2	9
9	Bogone	3	1	-	-	2	6
10	Maunggan	1	2	-	-	1	4
11	Kwinyat	5	2	-	-	-	7
12	Mutpon	3	2	13	-	-	18
13	Shwemyinethiri	-	5	-	7	1	13
14	Zayarthiri	3	2	-	4	2	11
15	Tharyaraye	1	2	-	1	1	5
16	Hlaing	2	3	1	-	1	7
17	Myeinigone	3	1	1	-	-	5
18	Zayarmyine	3	-	3	-	-	6
19	Myinetharyar	3	2	-	1	-	6
20	Zeygo	9	1	2	-	-	12
21	Thirimyine	3	9	2	-	8	22
22	Thirimingalar	2	3	-	1	-	6
23	Ngantae	8	1	3	-	-	12
24	Chaukmile	4	4	-	-	-	8
25	Kyauktan	1	-	-	-	-	1
26	Sangyi	1	3	-	-	-	4
27	Gwegone	2	1	-	-	-	3
28	Naungkari	2	1	-	-	-	3
29	Nyaungbinseik	3	-	-	3	-	6
	Total	89	57	25	18	32	221

Source: Field Survey

The Affecting Factors on the Distribution of Cottage Industries in Mawlamyine City

Raw Materials

Raw materials requirements are affecting factor for distribution pattern of cottage industries in Mawlamyine City. Most of the raw materials are available from Bangkok, Yangon and within Mawlamyine Township. Nevertheless, the need for raw materials is still imperative for many cottage industries. The availability of raw materials affects production of the industries.

Transportation

Mawlamyine is a locational center of communication and transportation networks in Mon State. Mawlamyine is the main gateway to south eastern Myanmar. Thanlwin Bridge, the longest road and rail bridge in Myanmar is the most prominent landmark in the area. The city has central highway bus station. The city is connected to Hpa-an in Kayin State in the south-east and Dawei and Myeik in Tanintharyi Region in the south by road. Via Kawkareik, the city is also connected with Myawaddy (Thai-Myanmar Border Town). Newly opened Thanlwin Bridge (chaungzon) in April, 2017 connects Mawlamyine with nearly Bilu island. To the existing passenger traffic transportation routes support cottage industry to carry raw materials from markets and other sources. Tocarry finish products from the sources to markets, taxis and private cars are mostly used.

Market

In study area, cottage industries have regular markets and customers including retailers and wholesalers. Finished products of cottage industries are mainly sent to Myineyatanar Market, Thanlwin Market, Maungan Market and others.

Power Supply

The cottage industries mainly depend on the availability of power supply. Electricity for Mawlamyine City is supplied by Ngantae electricity plant (Myanmar Lighting, IPP Co. Ltd). In rainy season, the frequent power failures in Mawlamyine City is the problems of production. Therefore, they have used own generator. The area is sufficient in the electric supply especially in summer.

Investment

Since cottage industry is relatively small in size and the amount of investment required for certain items are not very large. But, some of the industries do not use electronic machine. Investment involves for a suitable land plot, for the construction of building and for necessary machines and buying raw materials and hired labour etc.

Labour

In Mawlamyine City, most of the cottage industries are require skilled labour. Skilled labour especially their ability, productivity and knowledgeable are important for production. Some owners used semi-skilled and unskilled labour to save the cost of labour. Labour requirement for Cottage industries are not uniform. In construction material industry, labour requirement varies from 5 to 7 and male labour are mainly used. In food and beverage industry, the average number of labour need

varies from 5 to 9. The majorities of labour are male and only few females labour are needed. Most of the consumer goods industries, the average number of labour needed varies from 3 to 7. Both male and female labours are used.

The average number of labour for clothing and wearing industy is needed between 3 to 9 person. The majorities of the labour are females and only few males labour are also found in this group. In miscellaneous industry, the average number is need between 2 to 5 and most workers are male.

Spatial Distribution of Construction Material Industry

There are 89 construction material industries or 40.27 percent of total cottage industry**.** The cottage industries are distributed in all wards in the study area . But, there is no construction material industry in Shwedaung and Shwemyinethiri wards. The industry is not only distributed along the main roads of Zegyo, Ngantae and Pebedan wards but also scattering along the cross roads within the wards. Many construction material industries concentrate in Hpettan ward, as shown in Figure (2).

Construction material industry included furniture (wood-based) indusrty, steel and aluminum industry and concrete brick and concrete pillar industry. All of them, steel and aluminium industry is the largest in number. These industeries depend mainly on permanent skilled worker. The majority of workers are from nearby wards. Although there is no difficult on labour, it is scarcity of skilled labour and these workers mobile from one place to another. In steel and aluminum industry, the main raw materials are available from Yangon.

In construction material industry, some machines are used. They needed more investment for the expansion of the industry. Some of the producers face the problem of insufficient investment. They borrowed from private banks or microfinance banks to expand their industry.

Table -2 Number of Construction Material Industry (2019)

No	Industrial Name	Number
1	Furniture (wood-based) Industry	29
2	Concrete Brick and Concrete Pillar Industry	6
3	Steel and Aluminium Industry	54
	Total	89

Source: Field survey

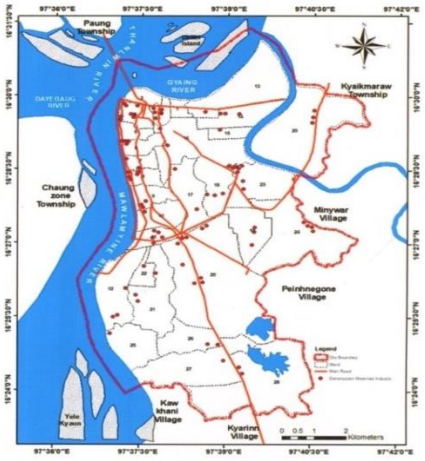

Figure – 2 Spatial Distribution of Construction Material Industry in Mawlamyine City (2019)

Source: Based on Table (2)

Spatial Distribution of Food and Beverage Industry

Food and beverages are the basic need for the people. There are 57 industries or 25.8 percent of total cottage industry in Mawlamyine City. This types of industry are second rank in the study area and these are mainly distributed in Thirimyine ward. There is not food and beverage industry in Mayangone, Zayarmyine, Kyauktan and Nyaungbinseik wards, as shown in Figure (3).

In operating food and beverage industry, both skilled and unskilled labour are required. This industry is operate with few workers. The majority of workers are rent with daily wage earner from the Mawlamyine Township.

Table -3 Number of Food and Beverage Industry (2019)

No	Industrial Name	Number
1	Bread and cake Industry	32
2	Fried-Bean Industry	3
3	Food Grinding Industry	5
4	Rice Noodle (*mokehinkharphat*) Industry	4
5	BeanCurd (*pal-pyar*) Industry	1
6	Spices Industry	1
7	Fried (*par-pal*) Industry	3
8	Sweet Preserved Lemon (*showtheesaypyar*) Industry	2
9	Fried Onion Industry	2
10	Fried (*Sarkhalaygwe*) Industry	2
11	Strudel flake (*kawpyant yat*) industry	1
12	Mould Industry	1
	Total	**57**

Source: Field Survey

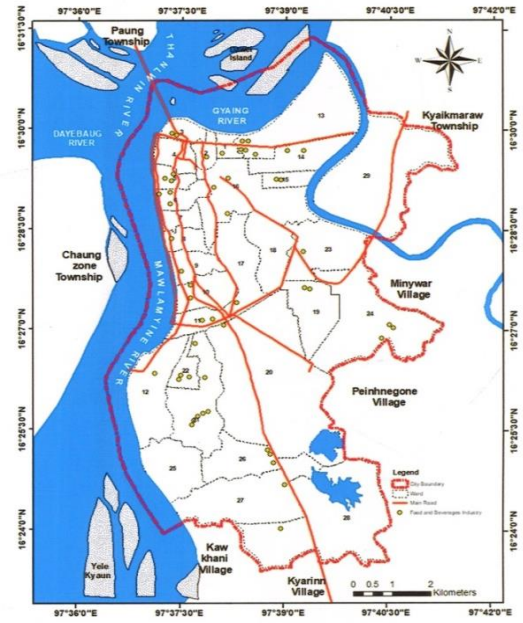

Figure –3 Spatial Distribution of Food and Beverage Industry in Mawlamyine City (2019)

Source: Based on Table (3)

Spatial Distribution of Consumer Goods Industry

Consumer goods industry plays an important role for the people. The number of consumer goods industry were 25 or 11.31 percent of the total. Mutpon ward posses largest in number with 13. And they are also be found in Zayarmyine, Ngantae, Zegyo, Thirimyine, Hlaing and Myenigone wards. But, other wards have no this type of industry, as shown in Figure (4).

This industry require both skilled and unskilled labour. In this group, the number of pottery industry is the largest in Mutpon ward. This industry use few worker. In this group, only purified drinking water industry use machine. Therefore, they need more investment for their production.

Table – 4 Number of Consumer Goods Industry (2019)

No	Industrial Name	Number
1	Soap and Beauty Cream Industry	1
2	Candle Industry	3
3	Purified Drinking Water Industry	2
4	Pottery Industry	10
5	Traditional Medicine Producing Industry	2
6	Blacksmith Industry	3
7	Plastic Basket Industry	1
8	Broom Industry	3
	Total	**25**

Source: Fied Survey

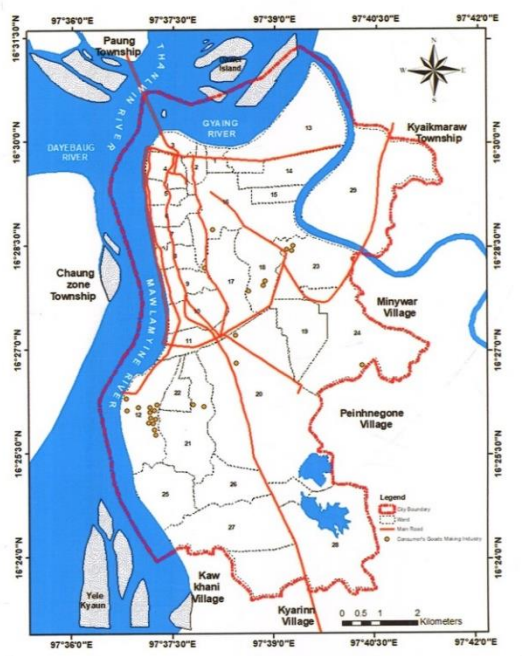

Figure - 4 Spatial Districation of Consumer Goods Industry in Mawlamyine City (2019)

Source: Based on Table (4)

Spatial Distribution of Clothing and Wearing Industry

Clothing and wearing industry are 8.14 percent, 18 out of the total number of industries and it is fourth rank in the study area. It is mainly distributed in Shwemyinethiri and Nyaungbinseik wards. This industry is also found in Aukkyin, Zayarthiri, Tharyaraye, Myinetheryar, and Thirimingalar wards , as shown inTable (5).

Tailoring industry is mainly found in this group. It is not easy to recruit sufficient skilled worker. Raw material of tailoring industry are cotton. The raw materials are available from Bangkok, Yangoon and some regions within Mawlamyine District. Buying raw materials direct cash payment is practiced and cost of raw materials vary seasonally. The fluctuation of raw material price depend on the exchange rate of US dollar.

Clothing and wearing industry needs electricity to produce their product. Clothing and wearing industry uses machines in production. Machine is bought from Yangon. The expansion of the size of industry need more investment.

Table – 5 Number of Clothing and Wearing Industry (2019)

No	Industrial Name	Number
1	Tailoring Industry	16
2	Wearing Logo (printing) Industry	1
3	Bra Manufacturing Industry	1
	Total	**18**

Source: Fied Survey

Spatial Distribution of Miscellaneous Industry

There were 32 miscellaneous industries and it is 14.5 percent of the total industry in Mawlamyine City. This type of industry is the third rank in study area and they are distributed mostly in Thirimyine and Hpettan wards. Some wards have small number of miscellaneous industry. Most of the miscellaneous industries are mainly distributed in the wards of Kyaikpane, Mandalay, Hpethan, Shwedaung, Sikkegone, Pebedan, Bogone, Maungan, Shwenyinethiri, Zayarthiri, Tharyaraye, Hlaing and Thirimyine ,as shown in Table (6)

This industries do not use electricity. The production is made only by hand. But, they use electricity for lighting.

Table – 6 Number of Miscellaneous industry (2019)

No	Industrial Name	Number
1	Goldsmith Industry	30
2	Coir Rope Industry	1
3	Cheroot industry	1
	Total	**32**

Source: Field Survey

Average Nearest Neighbor Analysis

The distribution pattern of cottage Industries in Mawlamyine City is described by the method of nearest neighbor analysis. This analysis is based on the measurement of the actual straight-line distances separating a point. It attempts to measures the distribution of points according to whether they are clustered, random and dispersed, the value of nearest neighbor analysis range between two theoretical extremes 0 and 2.15. The index value of 0.00 for a totally clustered pattern and 1.0 means a random distribution and a maximum of 2.15 for a completely dispersed space pattern.

Howerever, this study used computer programmed such as Arc view and Arc GIS to measure the nearest neighbor statistics. In the distribution of cottage industries in Mawlamyine City, average nearest neighbor statistics is 0.58. This value lies in the clustered group. The result also showed that there is less than 1% likelihood that this clustered pattern could be the result of random chances,as shown in Figure (5).

In construction material industry, from the resultant value of nearest neighbor analysis, the observed is 235.6519 meters and expected mean distance is 422.3948 meters. Nearest neighbor ratio is 0.557895, Z score is -7.843425 and P value is 0.000000. In this case, the result less than 1% is that the clustering of high value could be the result of random chance. Result of the above analysis shows that the distribution of construction material industry is in a high degree of clustered form. Construction material industries are clustered along the lower main road, Baho rood, Upper main road and are also found in other words of the city.

In food and beverage industry, observed and expected mean distance are 328.5092 meters and 564.0734 meter respectively. Nearest neighbor ratio is 0.582387, Z score is -5.761111 and P value is 0.000000. The result also showed that there is less than 1% likelihood that this clustered pattern shows the result of random chances. According to the result, especially food and beverage industries are found in the western part of the city.

According to the nearest neighbor analysis, in comsumer goods industry, observed and expected mean distance are 415.8426 meters and 531.1823 meters respectively. So, nearest neighbor ratio is 0.782862, Z score is -2.118131 and P value is 0.34164. In this case the result less than 5% likelihood that this clustered pattern shows the result of random chance. This situation is also an evidence on the visual analysis on the distribution maps. Mutpon Ward is mostly found in consumer goods industry than other wards in the study area.

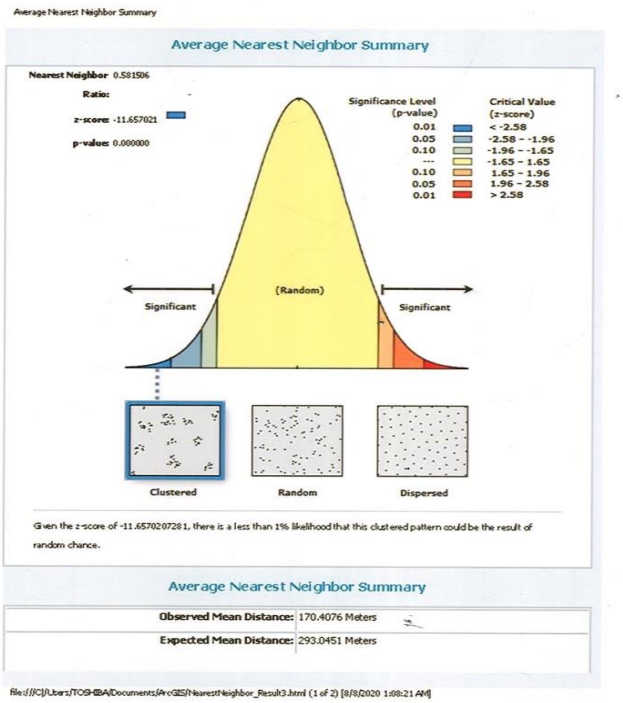

Figure – 5 Average Nearest Neighbor Analysis for Cottage Industries in Mawlamyine City (2019)

SWOT Analysis

Mawlamyine is the capital and the largest city of Mon state. In study area, there are many strengths, weakness, opportunities and threats about types of cottage industries. SWOT analysis will be aided to the present conditions of their production in cottages industries and it can be evaluate on production of types of cottage industries.

In Mawlamyine City, cottage industries have many weakness and threats that can be effected upon of their products and some of cottage are left because not expansion of their work.

Table – 7 SWOT Analysis of Types of Cottage Industries in Mawlamyine City

Strengths	Weakness
• Receive sufficient electric power • Have large markets • Get raw materials purchased easily within the township • Have transportation main roads and railway	• Worksite is narrow • Do not recruit skilled worker • Almost all of industries are mainly depend on workers • Their product brand are not famous • Some of cottage industries have an effect upon make a noise environment • Have raw materials interruption • Most of types of cottage industries are still in intermediate goods production • Do not get SMEs loans from government
Opportunities	Threats
• High family income • High job opportunities • High good use of local raw materials • Gainful employment of women • Can support country's GDP from household members of cottage industry	• Foreign brands coming into our business • Inflation large scale of China product • Flood impact production of types of cottage industry • Do not stable economic policy of the Government

Source: Field Survey

Findings and Discussion

The population of Mawlamyine City was 232,073 people in 2019, including 107,547 males and 124,526 females and its area is 41.23 sq miles (106.79 sq km). In 2019, a total of 221 cottage industries can be found in the 29 wards of Mawlamyine City. Most of the cottage industries do not register in respective department . They are very small, and they produce product for their survival. Thus, they are run by non-registered industries. The growth and development of industries are partly depend on productive labour force. Most of the entrepreneurs have trained as in apprentic before starting their industries and acquired technical and craft skills in self-study on the previous job basis. Most of the selected cottage industries have no business name or popular brand name. Small-scale industries are small in size, low production, less demand, so they use low quality and cheap raw materials. According to the entrepreneurs answered that in Mawlamyine City, most of the cottage industries are decreased significantly because lack of investment, technology, skilled labour and low quality products. But, they try to improve the quality of the products.

In study area, FDA approves and frequently tests by surprising checks for food and beverage industry and traditional medicine industries. The owners should try to reduce the unpleasant odour and environmental pollution. In food and beverages industries especially bread and cake making industries, the owners should describe the manufacture dates and expired date. Small scale industry

or cottage industries gradually decreased in number. Also, they do not want that their markets disappear. SMEs banks provided the loan for many years to registered cottage industries. Now, by the State sector provided the developments of SMEs banks, loans, insurance and technical aids. In the future, the cottage industries in Mawlamyine City will get success and reduce the problems by fulfilling the necessities which are required at present.

Conclusion

Distribution of cottage industries depends on labour, raw material availability, electric power and transportation. Establishment of cottage industries in Mawlamyine City affects jobs and income of the people living in the area. The location factor indicates the unevenly distribution of cottage industries. According to survey results, home sites are dominant factors for the establishment of all types of cottage industries. Labour, raw material availability, electric power and transportation are the major factors. The market is recorded as the second major important location factors. Most of the industries are not systematic economic planned as it is made only by hand. Thus, they just do the business because they created income opportunities as well as provide for their families.

Acknowledgements

First of all, we would like to express our heartfelt gratitude to Dr Tint Moe Thuzar, Rector, Dr Khin Myot, Pro-rector, Dr Khin Maw Maw Soe, Pro-rector, and Dr Myint Myint Oo, Pro-rector, Yadanabon University for their permission to carry out the research and their encouragement. We are greatly indebted to Dr. Khin Win, Professor and Head of Departmentof Geography and Dr. Yu Yu Swe, Professor, Department of Geography, Yadanabon University for their exhortation and helpful comments on this research. Lastly, this work is dedicated to all our teachers and colleagues who have helped out with great kindness and patience.

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