Geographical Analysis on Small-Scale Industries in Bago Town

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Abstract

Small-Scale Industries (SSI) are catalyst in the socio-economic development of many countries in the world. Small-Scale Industries (SSI) are important role in Myanmar economy. Bago Town is one of the Bago Townships of Bago Region. The allocation of settlements, a number of commercial activities and some urban infrastructure are dominant in this area. Small-Scale Industries (SSI) are unevenly distributed within Bago Town. This research paper examines, spatial distribution pattern of Small-Scale Industries within Bago Town is analyzed into eight groups from the geographic point of view. Consequently, the nature, types of Small-Scale Industries and controlling factors for the Small-Scale Industries are studied. The total number of small-scale industries in the whole town is 387 and among them 65 or 17 percent are construction material industries. Most of the small-scale industries are found in Shinsawpu Ward with 23 or 5.9 percent. The growth and development of industries partly depends on raw materials, labour, power, market and transportation.

Keywords:
Nature, types and controlling factors

Introduction

Economically, Myanmar is still an agro-based country. Industrialization is an essential element for the economic development of a country. Economic development has often been equated with the progress of industrial sector. Thus, Myanmar is striving to improve the industrial development just like other developing countries. Small-scale industries occupy a special place in the industrial structure.

Bago Town is one of the small-scale industries developed townships in Bago Region and different types of industries are concentrating and distribution pattern of industries are uneven. The study focuses on this township which is directly related to the small-scale industries. Emphasis is put on the spatial distribution of small-scale industries by types, wards, population concentration and controlling factors.

Aim and Objectives

The aim of this study is to identify the spatial distribution of small- scale industries and the influencing factors of the development of small- scale industries in Bago Town.

The analysis will cover the following objectives;

- to examine the distribution pattern of small- scale industries and
- to find out the controlling factors of small- scale industries within Bago Town

Sources of Data and Methodology

Primary data are collected by means of field survey and personal investigations. Secondary data are obtained from Township Administrative Office and Land Records Department. To find out the relation between population and number of small- scale industries, Pearson's product moment correlation coefficient and student's t test are applied to analyze. Partial Correlation Analysis used to describe the controlling factor of small-scale industries. Moreover spatial distribution of small-scale industries is checked by Nearest Neighbour Analysis, revealing as being clustered for the study area. Then mean centers are used to present and standard distance with one standard deviation is applied. By using the SPSS and GIS tools, distribution pattern of small- scale industries are clearly expressed.

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Study Area

Location, Size, Shape and Boundaries

Bago Town is situated in the southern part of Bago Township and comprises 31 wards in the urban area. It lies between 17° 15' 15" and 17° 21' 20" North latitudes and 96° 27’ 00" and 96° 30’ 45" East longitudes. The town area is bordered by Warmayan, Mekhon, Okehpo Village Tracts on the north, Kamarnat, Hmontaing, Auksidee (west) Village Tracts on the east, Zaynyaungpin, Gwayttanshey Village Tracts on the south, and Nyaunginn Village Tracts on the west. Bago Town has an area of 48.4 square kilometers (18.69 square miles). The extension of town area along the Yangon-Mandalay railroad and road has given the town an elongated shape.

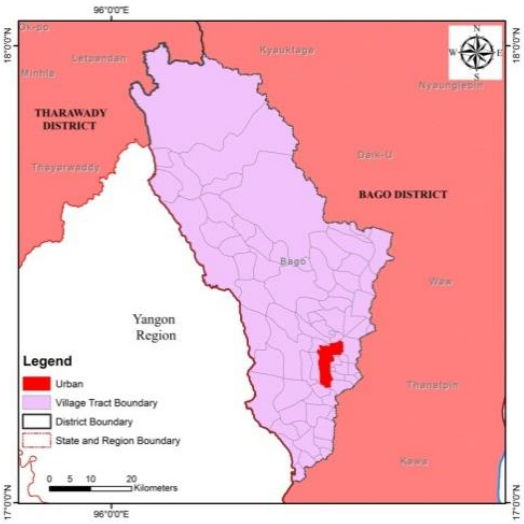

Figure 1. Location Map of Bago Town Within Bago Township
Source: Myanmar Survey Department

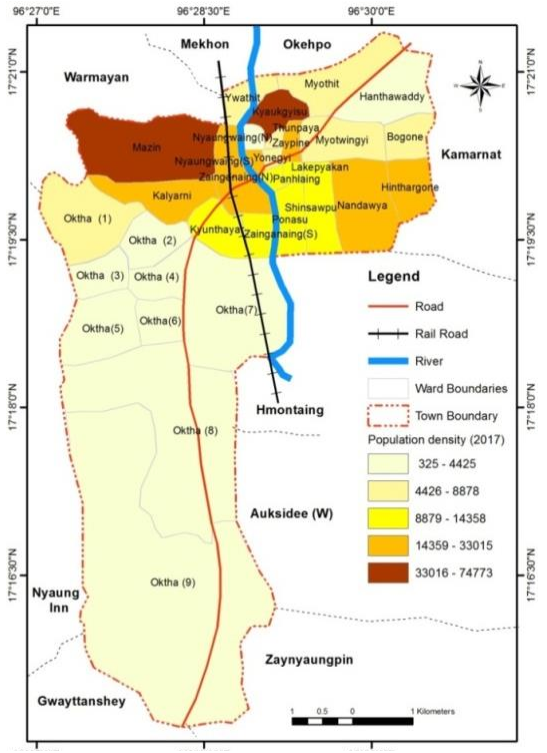

Figure 2. Population Density of Bago Town (2017)

Population Distribution and Density

The population within the Town is not evenly distributed. Population distribution is highly concentrated in the central part of the Township because of accessibility. Nandawya ward has the largest population due to good communication and economic activities. The total population of Nandawya ward in 2017 was 31589 people or 13 percent and Zaypine ward was the lowest population with 990 people or 0.4 percent of the total population. Among them, Mazin ward of population density was highest with 74773 people per square kilometer and Oktha(9) ward was lowest with 325 people per square kilometer. Population numbers and density of Bago Town in 2017 are presented in figure 2

Types of Small-scale Industry

Small-scale industries include the secondary production. This study will include the small-scale industries with 3-25 horse-power, 10-50 labours, ks 1-10 million kyats of capital investment and a production value of ks 2.5 million, but excluding services activities and the industries run by less than 9 workers.

Field surveys were conducted, based on the data available from Township Development Committee. In 2017, Bago Town has about 387 industries that have registered to the Township Development Committee. Generally, they are divided into eight groups.

Table 1 Small-scale Industries by Type in Bago Town, 2017

No.	Types of Industry	Total	Percentage
1	Construction Materials Industry	65	17
2	Transport Vehicle Industries	59	15
3	Food and Beverages Industry	54	14
4	Household Goods Industry	52	13
5	Printing and Publishing Industry	36	9
6	Clothing and Wearing Industry	21	5
7	Handicraft Industry	18	5
8	Miscellaneous Industry	82	21
Total		387	100

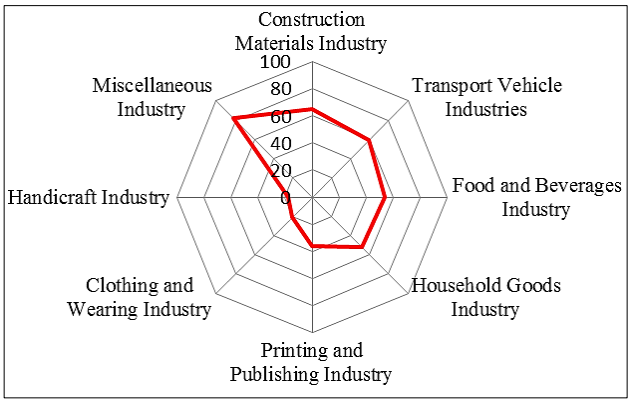

Figure 3 Type and percentage of Small-scale industries in Bago Town(2017)

Source: Based on table 1

Source: Township Development Affairs and Development, field work(2017)

Distribution of Small-scale Industry

Bago Town is situated in the southern part of Bago Region. It is composed of thirty-one wards. Different types of small-scale industries are widely distributed in every ward. The total number of small-scale industries in Bago Town is 387. Shinsawpu ward has the largest number of industries with 23 or 5.9 per cent, followed by Nandawyar ward with 22 or 5.7 per cent and Myotwingyi ward with 21 or 5.4 per cent, among the wards of Bago Town. The number of small-scale industries and their respective wards are shown in figure 4

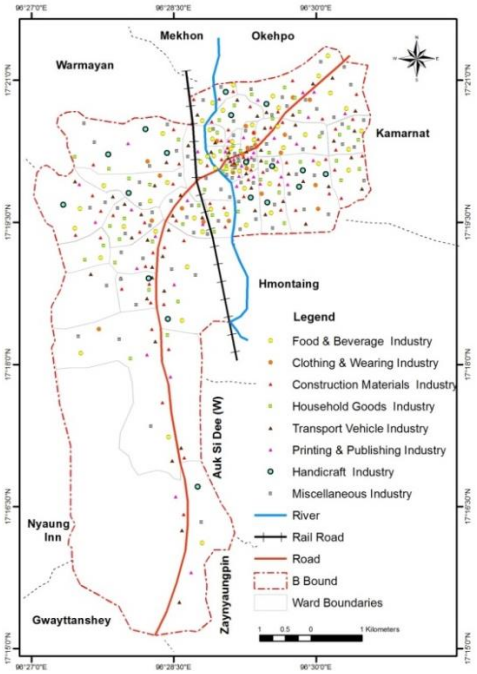

Figure 4 Distribution of Small- scale industries in Bago Town

Source: Township Development Affairs and Development, field work(2017)

ANALYSIS ON DISTRIBUTION OF SMALL-SCALE INDUSTRIES

The Correlation Coefficient Index and Student's t Test

The relationships between total population and number of small-scale industries and between area distributions of wards and number of small-scale industries are analyzed by Pearson's Product Moment Correlation Coefficient (r) and the resulted values are shown in table. According to the calculated values, there are negative correlation between areas of wards and number of small-scale industries (r = - 0.005) and positive correlation exists between the total number of population and number of small-scale industries. The calculated coefficient (r = +0.67) clearly implies that there is a high degree of positive correlation between the total number of population and number of small-scale industries in Bago Town.

Table 2 Student's "t" value for population and Small-scale Industries

Correlation Between	Correlation Coefficient (r)	t value
Population and small-scale industries	0.670	4.421
Area and small-scale industries	- 0.005	-

Source: Calculation

However, the statistical significance of the correlation coefficient should always be tested by Student's t test. The null hypothesis that postulated is that there is no correlation between the two variables, i.e. H_O is r = 0

The "t" value for this test is 4.4 . By referring this t value and the degrees of freedom to the Student's t graph in Figure 5, it can be seen that if the rejection begins at 0.1% level and therefore the null hypothesis can be rejected. In fact, it can be rejected with no more than a 0.1% chance of being wrong, and the inverse hypothesis that there is a correlation between the two sets of data can be accepted, i.e. this coefficient is highly significant statistically (99.9% correct). Therefore, it can be said that there is a direct relationship between the total number of population and the number of small-scale industries in Bago Town at 0.1% level. However, according to the coefficient of determination is the correlation coefficient square (r^2 = 0.46), it means that the population distribution alone can represent 46% of the relationship. The rest 54% will be influenced by other factors.

Furthermore other controlling factors are considered in study area. Partial Correlation Coefficient Method is used to analyze the relationship between the total number of population and number of small-scale industries, controlling variables by investment, power and labour in Bago.(shown in table 3). According to partial correlation between population and small-scale industries is fairly when controlling for the power. The result of correlation coefficient value (r) is (+ 0.502) and statistically significant $p < 0.05$. There was a weaker correlation between two variables, whilst controlling for investment, which was correlation coefficient value (r) is (+ 0.37) and statistically significant $p > 0.05$. The relationship between population and small-scale industries are low positive correlate with the control variable of labour (r) = 0.242 and $p > 0.05$. This suggests that, investment, power and labour are influenced in controlling for the relationship between population and small-scale industries.

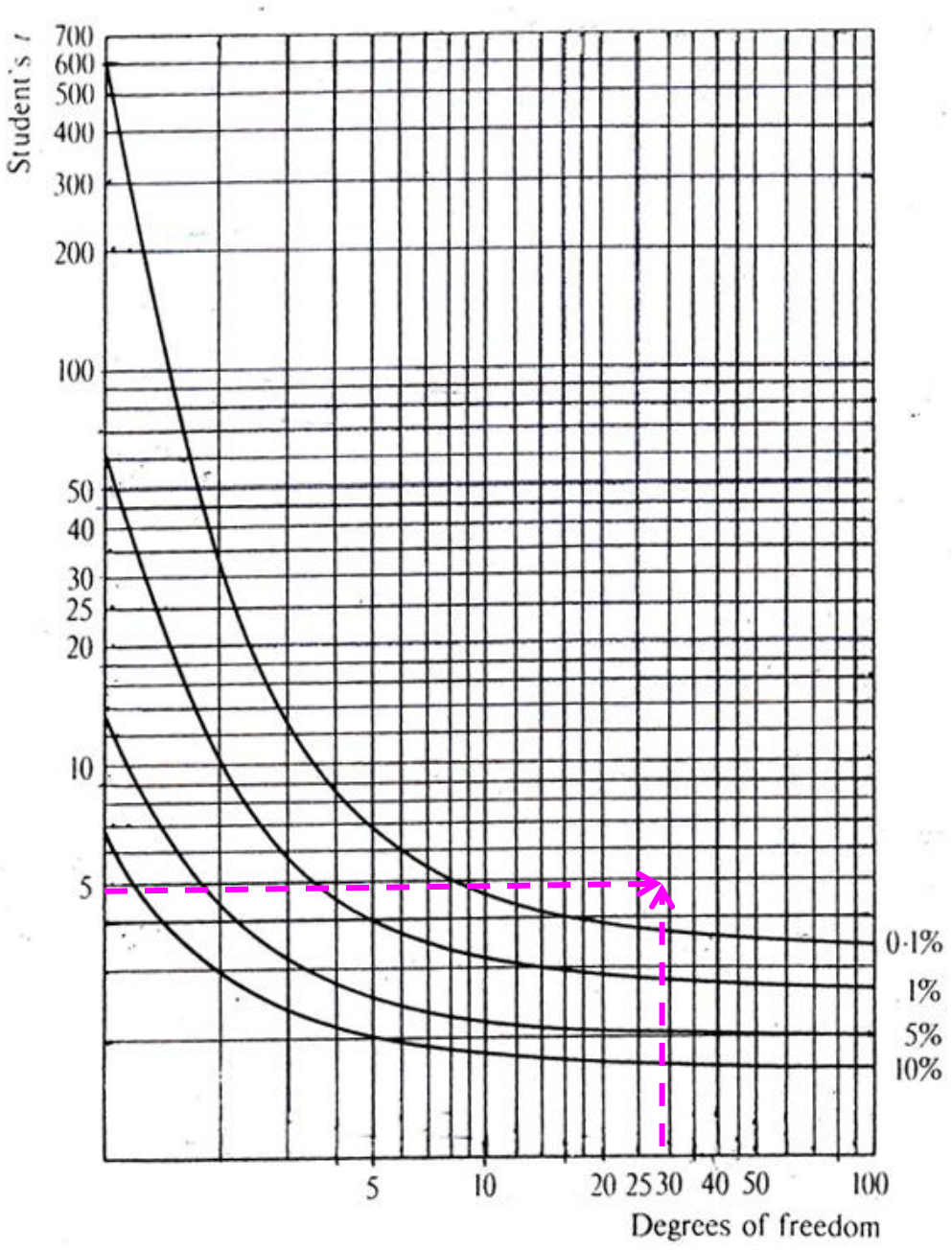

Figure 5 The Student's "t" Test for Total Population and Number of Small-scale Industries

Table 3 Partial Correlation

		Population	Industry	Population	Industry	Population	Industry
Control Variables		Power		Investment		Labour	
Population	Correlation	1.000	0.502	1.000	0.370	1.000	0.242
	Significance (2-tailed)	.	0.005	.	0.044	.	0.198
Industry	Correlation	0.502	1.000	0.370	1.000	0.242	1.000
	Significance (2-tailed)	0.005	.	0.044	.	0.198	.

Source: Calculation

Nearest Neighbour Distance Analysis (Spatial Statistics)

According to calculated value, the distribution of small-scale industries in Bago Town, average nearest neighbour statistics is 0.87. This value lies in the clustered group. Nearest neighbor observed mean distance is 79.43 meters and expected mean distance is 93.03 meters. Thus, nearest neighbour ratio is 0.8699. The result also showed that there is less than 1% likelihood that this clustered pattern could be the result of random chances. (Shown in table 4)

Table 4. The result of spatial distribution pattern in Bago Town

Township	Distance Ratio	Significant Level	Z Score	Critical Value	Distribution Pattern
Bago	0.87	0.01	- 4.93	- 2.58	Clustered

Source: Calculation

Mean Center and Standard Distance by Type

According to the calculated value, all types of industries, except Transport Vehicle and Clothing and Wearing industries, have their mean centers which are located at Zaigganaing(N) (17° 19' 45" north and 96° 29' 02" east) and 85 percent of industries are located within the distance of one standard deviation. They are widely distributed, but small-scale industries are unevenly distributed in Bago Town. It is shown in Figure 6.

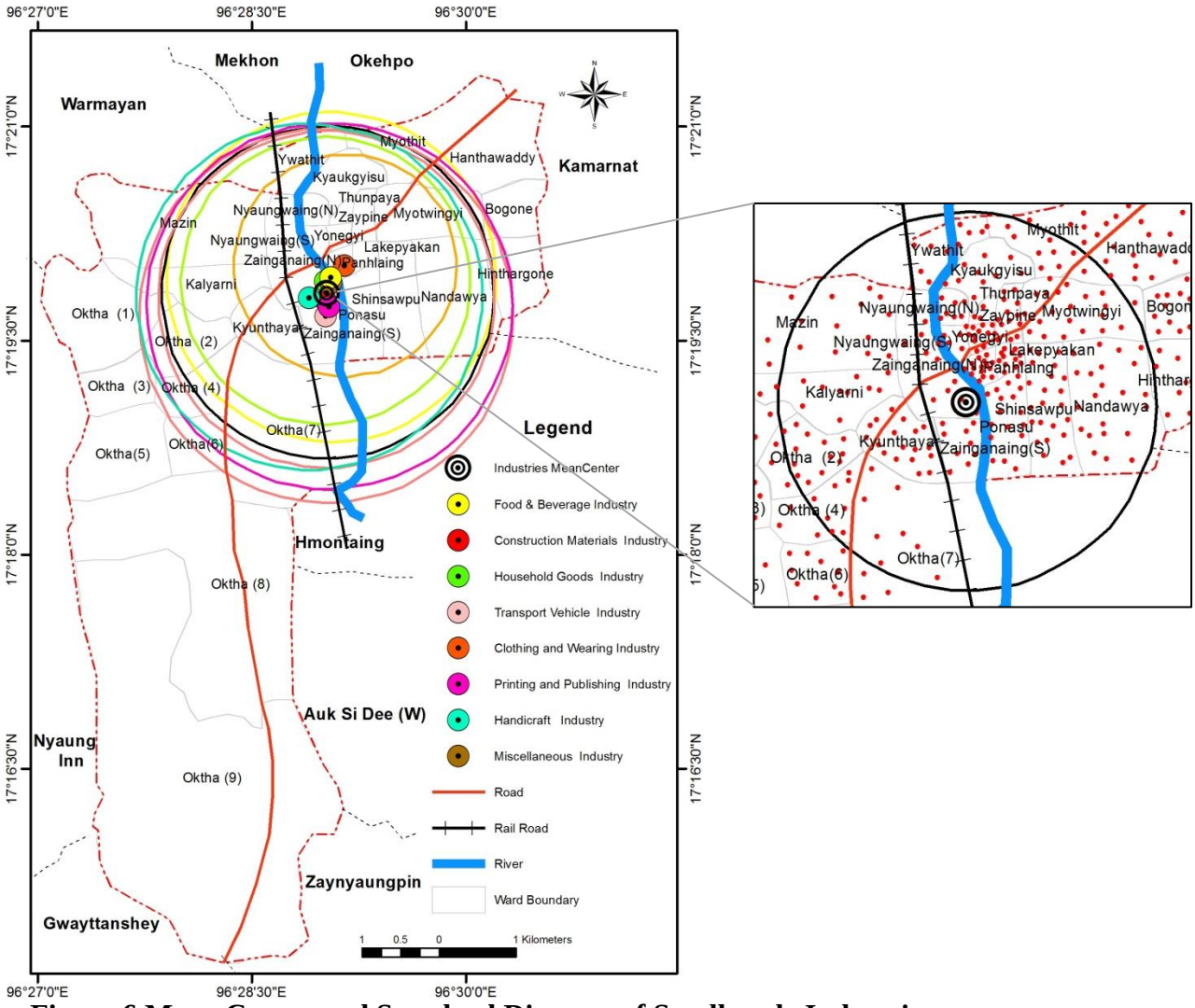

Figure 6 Mean Center and Standard Distance of Small-scale Industries

Finding and Suggestions

Bago Town is situated in the southern part of Bago Township and comprises 31 wards in the urban area. Generally, small-scale industries are unevenly distributed in this town. Most of the industries are found in central part of Bago Town. The number of small-scale industries in the whole town is 387 including 8 main types. Among them 23 industries or 6 percent are found in Shinsawpu ward because population density of the ward is high with 11273 per square kilometer and the crossing of Bago-Thanatpin Road through this ward. There is lowest number of small-scale industries in Oktha (5) with 2 industries due to being the Hanthawaddy international airport project.

According to the statistical and spatial analyses, the distribution of industries mainly depends upon the distribution pattern of population. On the other hand, other controlling factors are considered in study area, the correlation between population and small-scale industries are weaker when controlling for the investment, power and labour. To suggest that, investment, power and labour are influenced in controlling for the relationship between population and small-scale industries.

Small-scale industries are occupying a very important place in the industrial structure of the country. Thus, improvement in techniques and modern technology in small-scale units, imparting proper education and training to workers engaged in small-scale units, provision for cheap and regular supply of electricity, maintaining standards and quality of the output produced by small-scale industry units with further enhance the development.

Conclusion

The development of small-scale industries, the same types of industry should cooperate with each other, share the knowledge, produce high quality products and try to compete with the local products and imported foreign made products, based on good managerial skills.

However, the new government has been taking effort to create a better business environment and give industrialists awareness on the changes under way and challenges ahead. As such, small-scale industries of this town are more likely to develop more in the near future.

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References

Khin Soe Khine.(2014), "The Geographic study of Cottage Industries in South Okkalapa Township", Ph.D Dissertation, Geography Department, University of Yangon, Myanmar.

Ohnmar Than.(2007), "Policies and Practices of SMEs in Myanmar City", Ph.D Dissertation, International Relations Department, University of Yangon, Myanmar.

Pan Sein.(2011), " Geographic Study of Cottage Industry in Insein Township", MRes., Geography Department, University of Yangon, Myanmar.

Thida.(2013), "A Geographical Study on Cottage Industries in Bago", M.A Thesis, Geography Department,
University of Bago, Myanmar.

Thida Myint.(2008), "Small and Medium Enterprises (SMEs) Development in Myanmar (1988-2008)", Ph.D Dissertation, International Relations Department, University of Yangon, Myanmar.