

A GEOGRAPHICAL ANALYSIS ON DISTRIBUTION OF MARKETS IN SITTWAY TOWNSHIP

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Abstract

Theoretically, markets are located in the place where demand and supply meet together. However, other factors are differences in market, variations and transportation system and different nature of customers. This paper attempts to find out the factors that controls the development of markets in Sittway Township. Official statistics related to population, markets, etc. are collected from Township Administrative Office, Land Records Department, Meteorology and Hydrology Department, Department of Municipal and Ministry of Immigration and Population. These statistics are verified by field observation and recorded on Geographic Information Systems. Then, spatial analysis is conducted by using ArcGIS Version 9.3 software. Based on derived results, some markets are selected to conduct a questionnaire survey and to examine the controlling factors of location. Based on the analysis of derived data by using Microsoft Excel database, markets location are evaluated. The results reveal that markets are systematically (in hierarchical and functional patterns) located in Sittway Township. These patterns are controlled by accessibility, preference based on specific items, and sellers' strategy of business.

Introduction

Market is defined as an occasion when people buy and sell, on open area or building (Oxford Advanced Learner's Dictionary 8th edition CD-ROM, 2010). In practice, however, the definition and location of markets are very complicated rather than simply defined by supply and demand. Its location is controlled by others such as social, infrastructure, relative location, etc. Thus, the locational factors controlling the distribution of market are necessary to know from geographic point of view.

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Research Question

- (1) How does spatial distribution of markets vary in size and function?
- (2) What are the major controlling factors of market location?

Research Hypothesis

- (1) Spatial distribution of markets is variable in size and function within the study area.
- (2) These variation are operated by demand, supply, infrastructure and government policy.

Data and Method

First research hypothesis is that there are variations in the distribution of markets in terms of function and size in the study area. To prove this hypothesis secondary data are collected from Market Department, Sittway Town Development Committee. The level of markets, area, number of shops, date of establishment and selling items, etc. are involved in these data. By using ArcGIS 9.3 software, the above data were depicted as distribution map for visual and preliminary analysis.

Second research hypothesis is related to the controlling factors within the above market distribution variation. In order words, it is concerned with location factors of markets in the study area. There are four major hypotheses for controlling factors of markets location: customers, sellers, infrastructure (accessibility to market) and government policy.

To analyze the customer factor, population and population density of each ward in the study area was collected from Ministry of Immigration and Population. Then, it was analyzed by using total number of shops in the market derived from Market Department of Sittway Town. Furthermore, customers from each market were interviewed about the current buying items and their preference in the purchasing of different items. Structure interviews were conducted to 529 customers from 11 markets. It is considered desirable to establish the true mean's limits with a probability of 95 percent and the standard error is 3.

As sellers factor, each market was interviewed about their purchasing linkages and customer linkages in spatial regions. Altogether, 543 sellers were interviewed to examine the supply factor. To examine the infrastructure aspect, number of bus lines and ship line, number of buses and ships and average number of passengers were collected from Sittway Town.

Geographical Factors

Physical Factors

Sittway Township is located between 20° 7' N and 20° 17' N latitudes and 92° 46' E and 92° 56' E longitudes. It has an area of 231.59 square kilometre or 57228 acres (89.42 square miles) in Figure 1 and 2. It is bounded by Rathetaung and Ponnagyun townships on the north, Mrauk-U Township on the east, Pauktaw Township on the southeast and Bay of Bengal on the south and west. The study area consists of seven townships in the Rakhine State, which comprises 32 wards and 27 village tracts in Figure 3. It is mainly composed of alluvial plain. It is built up by Mayu, Kalandan and Lemyo rivers. This plain is well known Sittway Plain. The most prominent river is Kalandan, which is 482.80 kilometres (300 miles) and passes through southward of Sittway Town. It enters the Bay of Bengal in the east of Sittway Township. Other tributaries are Satyogya, Mingan, Kala, Kamaung and Htaung creeks. These creeks are tidal in action.



Figure 1: Location of Rakhine State within Myanmar
Source: Myanmar Survey Department

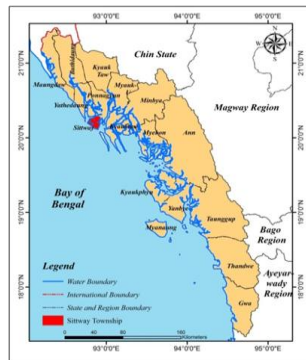


Figure 2: Location of Sittway Township within Rakhine State
Source: Myanmar Survey Department

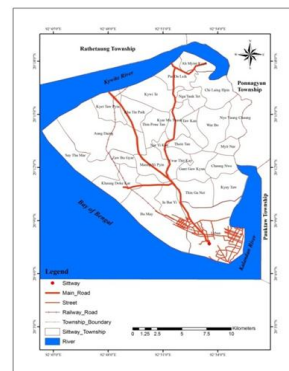


Figure 3: Location of Sittway Township
Source: Survey Department

Human Factors

Population is an important factor of market distribution in Sittway Township. The total population was 219421 persons in 2002-2003 and 147899 persons in 2013-2014. In the study area decrease of population is influenced on main factors as out migration to other areas.

The population of Sittway Township is unevenly distributed between 2002-03 and 2013-14. Myoma (Urban ward) is mostly accessible to all village tracts in Sittway Township and other townships. Bumay, Aungtine, Maungnipyin, Theinganat and Inbari were easily connected to Sittway Town and surrounding village tracts. The population distribution is highly concentrated in Sittway Township Figure 4. The most densely populated areas were Myoma Ward from 6884 persons to 5084 persons per square kilometre, Nar Yi Kan Village Tract; 1289 persons to 2303 persons per square kilometre, Pa Da Leik Village Tract; 299 persons to 599 persons per square kilometre and Kyay Taw Village Tract; 595 persons to 760 persons per square kilometre between 2002-03 and 2013-14. Moreover, the lowest densely populated area are Bumay Village Tract; 648 persons to 10 persons per square kilometre, Inbari Village Tract; 722 persons to 44 persons per square kilometre between 2002-03 and 2013-14. Because, Bumay and Inbari village tracts are near the Sittway Town and main factors as out migration to other areas. Figure 5 and 6 show the density of population in Sittway Township from 2002-03 to 2013-14. Khaung Doke Kar was lowest density with 210 persons per square kilometre in 2002-03 and 3 persons per square kilometre in 2013-14.

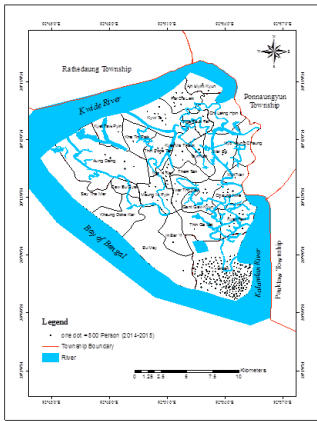


Figure 4: Population Distribution of Sittway Township (2013-14)

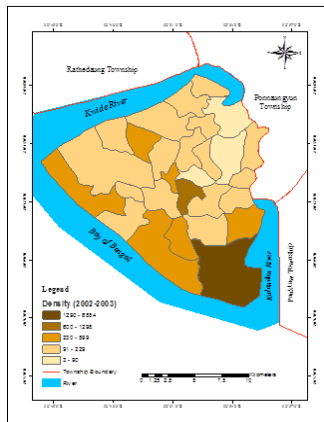


Figure 5: Population Density of Sittway Township (2002-03)

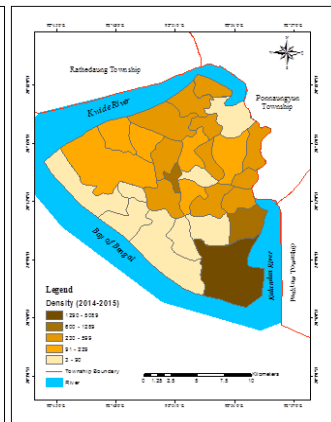


Figure 6: Population Density of Sittway Township (2013-14)

Findings and Discussion

Market Types

The study area has two types of markets such as permanent and street vendor markets. Permanent markets were established based on population pressure and good transportation network. This type of market sells various kinds of thing in the permanent market on permanent shops. When the number of sellers increase second type of market appear on road side which are defined as street vendor market. As a distinguished point many of street vendor markets are doing business only in the mornings, evenings while others in both morning and evening. Sittway Township has 2 permanent markets: Myoma Market (New Municipal Market) located on the Market Street and Mayyu Market located on the Mayyu Street and 18 street vendor markets their locations (Figure 6) are as follow: Both morning and evening street vendor markets are:

- (1) Navy Market on the Satmue Lan Haung Street,
- (2) Thatkapyin Market in the Thatkapyin Village,
- (3) Thandawli Market in the Thandawli Village,

- (4) Taychaung Market in the Taychaung Village,
- (5) Paryame Market in the Padalake Village,
- (6) Chatawpyar Market on the Shwepyazay Street,
- (7) Amyinkyun Market in the Amyinkyun Village.
- (8) Darpine Market in the Darpine Village,
- (9) Panlinpyin Market in the Panlinpyin Village,
- (10) Byinphuywa Market in the Byinphuywa Village,
- (11) Minzan Market on the Ywagyi Street
- (12) Konetan Market on the Konetan Street,
- (13) Sanpya Market on the Hotel Sin Street,
- (14) South Ywagyi Market on the Ngapain Street,
- (15) North Ywagyi Market on the Waset Street,
- (16) Makyemyine Market on the Makyemyine Street,
- (17) Bumay Market in the Bumay Village,
- (18) Mingan Market on the Mingan Awin Street.

Shop Types

Markets have different shops selling different items. For the analysis, items selling in the markets of Sittway Township are categorized as follows:

- (1) Meat, Fishes, Prawns and Vegetables
- (2) Grocery and Dry goods
- (3) Clothes and Garments
- (4) Medicines and Cosmetics
- (5) Hardware and Electronics
- (6) Others

Meat, fishes, prawns and vegetables are the items that customers need to buy on daily basis. It includes all types of meat, fishes, prawns, vegetables, fruits and flowers, the items that are perishable without refrigeration. Grocery goods and dry goods include milk, sugar, beverages like tea and coffee, rice, oil, salt, dried fish, dried prawn, paste fish, beans, etc. that are used in kitchen

and could be kept under natural environment for some period without refrigeration. Clothes and garments refer to all items of clothes, bags, and fabrics. Those items are usually purchased only two or three times a year for average income person. Medicines and cosmetics sometime are needed occasionally. Cosmetic is also referred to as luxury good. It is not a basic requirement for low income people. Hardware and electronic goods are sometimes referred to as construction goods that are needed in construction and renovation of houses.

Variations in Number of Shops among the Permanent Markets

Total number of shops varies among the permanent markets in Sittway Township. Myoma Market (New Municipal) has the largest number of shops and Mayyu Market has the smallest number of shops. Myoma Market has 738 shops while Mayyu Market has only 150 shops. The variation in number of shop depends on the environmental condition of the market and the availability of items. A market is also highly related to accessibility. When a market has good accessibility, people from a long distance will come to the market.

Variations in Shop Types within the Permanent Markets

Types of shops also varies in each market. Table 1 shows shop types of permanent markets. Myoma (New Municipal) Market comprises 118 meat, fishes, prawns and vegetables shops, 395 grocery shops, 146 cloth and garment shops, 73 medicines and cosmetics shops, 24 hardware and electronic goods shops and 94 others shops. Mayyu Market includes 18 meats, fishes, prawns and vegetables shops, 5 grocery shops, 126 cloth and garment shops, and 1 other shop. In general, Myoma (New Municipal) market has all types of shop while Mayyu Market is occupied by three types only. Since shop types are categorized based on the customer's requirement (buying) interval, which is functional variation and level of market in the study area. Myoma (New Municipal) Market has the highest level function and support all kind of items that customer need. On the other hand, Mayyu Market serves only clothe and garment, meat, fishes, prawn and vegetables, grocery and dry goods. Thus, it is a localized market and customers who need to buy cosmetic and gold, etc. have to use higher level market like Myoma (New Municipal) Market.

Table 1: Shop Types at Permanent Markets (January, 2013)

No	Market	Meat, Fish, Prawn and Veges	Groc. and Dry goods	Clo. and Gar.	Med. and Cos.	Hardware and Elect.	Others	Total
1	Myoma	118	395	146	73	24	94	738
2	Mayyu	18	5	126	-	-	1	150

Source: Market Department, Sittway City Development Committee.

Variations in Total Number of Shops among the Street Vendors

These markets also vary in terms of the number of shops. Paryame Market has the largest number of shops and South Ywagyi Market has the smallest number. Although all these street vendors were developed based on the local demand of customer, their size varies, based on market area. Markets with wider market areas have larger number of shops in Table 2.

Variations in Shop Types within the Street Vendors

Navy Market comprises 32 meat, fish, prawn and vegetable shops, 23 grocery and dry shops, 9 cloth and garment shops, 3 medicine and cosmetic shops and 6 others. Thatkapyin Market comprises 28 meat, fish, prawn and vegetable shops, 19 grocery and dry shops, 13 clothe and garment shops, 5 medicine and cosmetic shops, 4 hardware and electronic goods shops and 3 others.

Taychaung Market has 36 meat, fish, prawn and vegetable shops, 18 grocery and dry shops, 8 clothe and garment shops, 3 medicine and cosmetic shops and 4 hardware and electronic goods shops. Paryame Market consists 33 meat, fish, prawn and vegetable shops, 32 grocery and dry shops, 24 clothe and garment shops, 13 medicine and cosmetic shops and 1 hardware and electronic goods shops. Chatawpyar Market includes 15 meat, fish, prawn and vegetable shops, 6 grocery and dry shops and 2 clothe and garment shops. Amyinkyun Market comprises 16 meat, fish, prawn and vegetable shops, 6 grocery and dry shops, 5 clothe and garment shops and 2 medicine and cosmetic shops.

Darpine Market contains 28 meat, fish, prawn and vegetable shops, 14 grocery and dry shops, 5 clothe and garment shops, 3 medicine and

cosmetic shops, 3 hardware and electronic goods shops and 2 others. Panlinpyin Market has 27 meat, fish, prawn and vegetable shops, 17 grocery and dry shops, 7 clothe and garment shops, 5 medicine and cosmetic shops and 2 hardware and electronic goods shops. Byinphuywa Market consists 13 meat, fish, prawn and vegetable shops, 9 grocery and dry shops, 2 clothe and garment shops and 1 medicine and cosmetic shop. Minzan Market comprises 18 meat, fish, prawn and vegetable shops, 3 grocery and dry shops and 2 clothe and garment shops. Konetan Market includes 18 meat, fish, prawn and vegetable shops, 2 grocery and dry shops and 3 clothe and garment shops.

Table 2: Variations in Total Number of Shop among Street Vendors

No	Markets	Meat, Fish, Prawn and Vegetable (not room)	Grocery and Dry goods	Clothes and Garments	Medicines and Cosmetics	Hardware and Electronics	Others	shop room
1	Navy	32	23	9	3	-	6	41
2	Thatkapyin	28	19	13	5	4	3	44
3	Thandawli	17	18	12	7	2	-	39
4	Taychaung	36	18	8	3	4	-	33
5	Paryame	33	32	24	13	1	17	87
6	Chatawpyar	15	6	2	-	-	-	8
7	Amyinkhun	16	6	5	2	-	-	13
8	Darpine	28	14	5	3	3	2	27
9	Panlinpyin	27	17	7	5	2	-	31
10	Byinphuywa	13	9	2	1	-	-	12
11	Minzan	18	3	2	-	-	-	5
12	Konetan	18	2	3	-	-	-	5
13	Sanpya	21	6	-	-	1	-	7
14	South Ywagyi	22	-	3	-	-	-	3
15	North Ywagyi	25	6	3	-	-	-	9
16	Makyeemyine	37	13	1	3	-	-	17
17	Bumay	38	16	9	4	3	3	35
18	Mingan	25	10	1	-	-	1	12

Source: Market Department, Sittway City Development Committee

Sanpya Market has 21 meat, fish, prawn and vegetable shops, 6 grocery and dry shops and 1 hardware and electronic goods shop. Thandawli Market includes 17 meat, fish, prawn and vegetable shops, 18 grocery and dry shops 12 clothe and garment shops, 7 medicine and cosmetic shops and 2 hardware and electronic goods shops. South Ywagyi Market contains 22 meat, fish, prawn and vegetable shops and 3 clothe and garment shops. North Ywagyi Market consists 25 meat, fish, prawn and vegetable shops, 6 grocery and dry shops and 3 clothe and garment shops. Makyemyine Market comprises 37 meat, fish, prawn and vegetable shops, 13 grocery and dry shops, 1 clothe and garment shop and 3 medicine and cosmetic shops. Bumay Market has 38 meat, fish, prawn and vegetable shops, 16 grocery and dry shops, 9 clothe and garment shops, 4 medicine and cosmetic shops, 3 hardware and electronic goods shops and 3 others. Mingan Market contains 25 meats, fish, prawn and vegetable shops, 10 grocery and dry shops and 1 clothe and garment shop. There are 18 street vendors in the study area. Although there are variations in the total number of shops in each street vendor market, most of them are selling meat, fish, prawn and vegetables, grocery and dry goods and clothe and garment in Table 2.2. It reveals the fact that street vendors have developed based on the local customers' daily needs.

Spatial Distribution and Functional Variations of Markets in Sittway Township

There are 20 markets in Sittway Township. Of these, two are permanent markets and eighteen are street vendor markets. Myoma (New Municipal) Market is established early in Sittway Township. It was established in 1956. Remaining markets were opened after 1980. Between 1980 and 1990, 6 markets were established among the markets. After 1991, 13 markets were opened in the study area. Mayyu Market is largest market of the area and it has the largest area with 12261.88 square metre and Byinphuywa Market is the smallest market with 65.03 square metre.

The level of markets is based on the type of building and items sold in the market. In this categorization, Myoma Market sold all items and Mayyu Market sold 3 items these markets construct brick building. Therefore, these markets are known as high level markets. All street vendor markets sold basic

items needed and are constructed with brick, timber, bamboo, dhani and iron sheet. Street vendor markets are both medium and small level (Table 3).

Distribution of Markets

Table 3 and Figure 6 show the spatial distribution and functional variations of markets with the number of shops and level of markets in the study area. High level markets are sometimes closely located to low level markets. This figure showed the location of markets spatially as well as functionally.

Table 3: Some Facts of Markets in Sittway Township

No.	Market Name	Area (Sq. Metre)	Year of Establishment	Level of Market	Number of Shops	Building Type
1	Myoma	10902.15	1956	Large	738	Brick Building & 1 storey
2	Mayyu	12261.88	1992	Large	150	Brick Building & 1 storey
3	Navy	929.03	1980	Medium	41	Timber & Iron Sheet
4	Thatkapyin	116.13	1985	Medium	44	Timber, Bamboo & Iron Sheet
5	Thandawli	4532.44	1987	Medium	39	Timber, Bamboo & Iron Sheet
6	Taychaung	83.61	1989	Small	33	Timber & Iron Sheet
7	Paryame	371.61	1990	Medium	87	Timber & Iron Sheet
8	Chatawpyar	74.32	1990	Small	8	Brick Building, Timber & 1 storey
9	Amyinkhun	4046.83	1992	Small	13	Timber, Bamboo & Iron Sheet
10	Darpine	111.48	1993	Small	27	Timber, Bamboo & Iron Sheet
11	Panlinpyin	129.32	1993	Small	31	Timber, Bamboo & Iron Sheet
12	Byinphuywa	65.03	1994	Small	12	Bamboo, Dhani & Iron Sheet
13	Minzan	139.35	1998	Small	5	Bamboo, Dhani
14	Konetan	750.00	1998	Small	5	Timber & Iron Sheet
15	Sanpya	74.32	1998	Small	7	Timber, Bamboo & Iron Sheet
16	South Ywagyi	4046.83	1999	Small	3	Bamboo, Dhani
17	North Ywagyi	236.90	1999	Small	9	Timber, Bamboo & Iron Sheet
18	Makyeemyine	139.35	2000	Small	17	Brick Building, Timber & 1 storey
19	Bumay	222.97	2000	Medium	35	Timber, Bamboo & Iron Sheet
20	Mingan	492.39	2001	Small	12	Timber & Iron Sheet

Source: Market Department, Sittway City Development Committee.

Variations of Functions among the Markets

Figure 7 expresses the spatial distribution and functional variation of markets. From this figure, it is clearly understandable that large and medium markets of Myoma, Mayyu, Navy, Thandawli, Thatkapyin, Bumay and Paryame are located at terminal point of north, south and west to cover the

whole township. These seven large and medium markets have all functions (items sold) to support the residents of the township. Remaining small markets are located within the above seven large and medium markets. But these small markets could not supply all items that are available in large markets. These small markets sell only meat, vegetable and grocery which are basic need for daily life. Location of this small market also takes the point at the nearest distance compared to other luxury goods. In general, this figure consists the level and functional variation in location of market in Sittway Township.

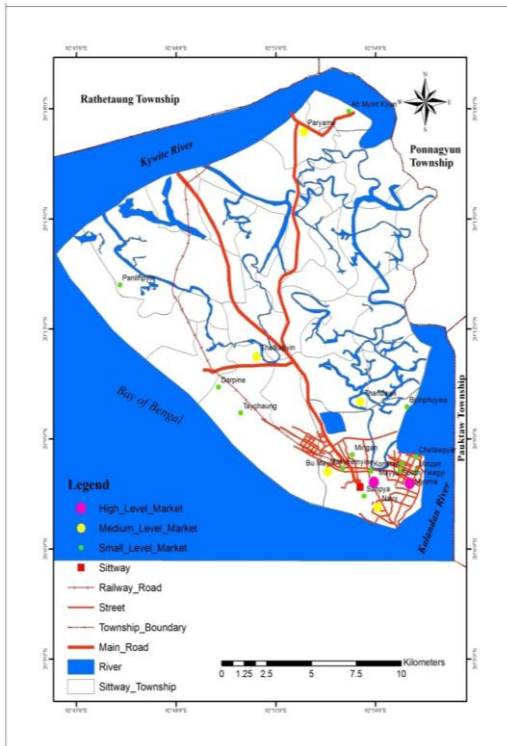


Figure 6: Distribution of Markets in Sittway Township
Source: Based on Table 3

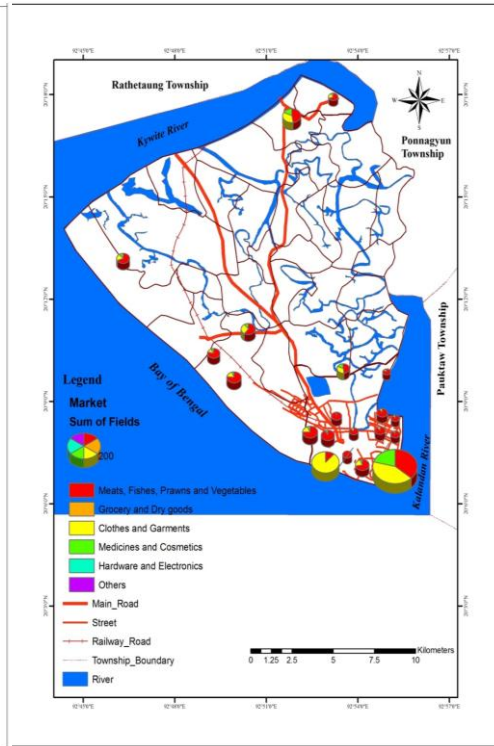


Figure 7: Variations in Markets by type of Commodities Sold
Source: Based on Table 2

Controlling Factors on the Distribution Pattern of Markets

Commodities can be classified into groups based on frequency of buyers such as daily consumption goods, luxury goods and long-term

consumption goods. Daily consumption goods refer to daily need, these markets should be located in a short distance. Large number of people has to commute to this kind of market daily. On the other hand, luxury goods and expensive goods are bought only once or twice a year. In this case, customers may take long distance to markets to buy such selective goods. Market growth and distribution is mainly considered by population and status of population as a main factor of demand and location of market. In previous part there are differences level of the market and their location. Thus, part examines the possible controlling factors of market location in study area. First, population factor was examined from the total population and population density point of view in the study area. Then, customer preference and seller type were analyzed by using data derived from field and questionnaires survey. Finally, accessibility of each market was analyzed as an infrastructure for location of market.

Population as a Factor of Demand and Markets Location

Figure 8 shows the population density by ward and village tracts and market level in the study area. Location and size of markets are also presented on the same figure. From this figure, distributions of market are related to the population of wards and village tracts where market is located.

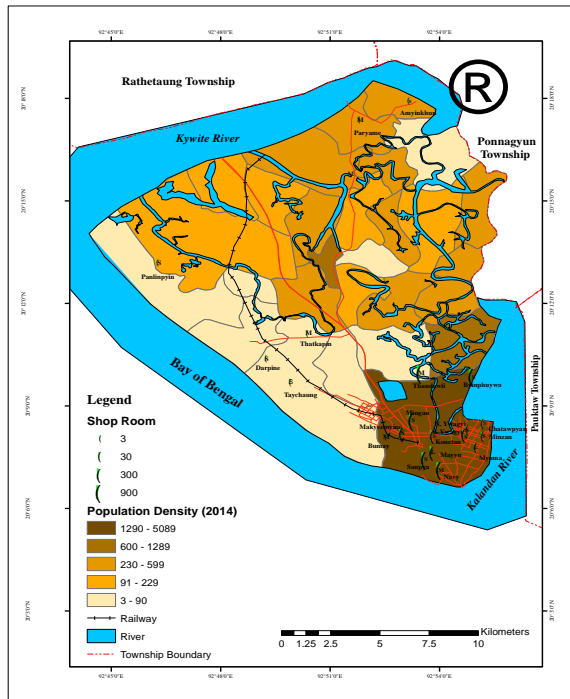


Figure 8: Numbers of Shops, Total Population and Population Density Used in Correlation Analysis

Source: Market data are derived from Market Department, Sittway City and population data was obtained from Ministry of Immigration and Population in Sittway City

To analyse in more detail Pearson's Product Moment Correlation Coefficient Analysis was conducted. Correlation coefficient value (r^2) between the total number of shop and population of ward and village tracts where market located is (0.03). It presents that population and number of shops are not related. Population density was used as second variable in correlation analysis. The resulted correlation coefficient between number of shops in market and population density of the ward is (0.04). It shows that there is fair correlation between these two variables. Thus, population density is not highly contributed to the location of markets. In this correlation, the population variables are not strongly determined by location of market.

Customers Aspect on Markets Location

Questionnaires surveys were conducted to customer preference on various markets. 523 customers were interviewed from 11 markets because remaining 9 markets were in limited situation for field survey. Firstly, customers were asked about the items that they were going to buy in the market. 272 out of 523 respondents (52 percent) they are buying meat and vegetables, 104 persons (20 percent) of customer are buying grocery and dry goods, 76 persons (15 percent) are buying the cloth and garment, 34 persons (7 percent) are buying cosmetic and medicine, 30 persons (6 percent) are buying electronic and hardware goods and 7 person (1 percent) buying food and drink in Table 4. It is clear that classification of goods used in the previous part has consistency with actual buying pattern of customers. One different point is gold and jewellery that was not counted in the previous classification because gold shops are lacking in the market except Makyimying Market.

Generally, customers have similar behaviours in Myanmar because the use of refrigerator is not expanded in Myanmar. The style of customers purchase meat, fish, prawn and vegetables for daily consumption, grocery and dry goods for median-term consumption, clothe and garment for long-term consumption, cosmetic and medicine for occasional consumption, gold and jewellery for very infrequent consumption. Based on purchasing behaviours depend on various patterns customer commuting markets are also varied. They use small market and street vendor near their home for meat, fish, prawn, fruit and vegetables. Most of the customers buy cloth and garment from the Myoma and Mayyu markets (large market) to sell back both township and other townships. They use medium size markets to buy cloth and garment. For luxury or cosmetic and medicine customer mostly use roadside store that are usually located near large junctions. For gold and jewellery purchase customers use outside the large market such as Kyaybingyi and Odan wards.

Table 4: Purchase Items of Customers in Shopping

Purchase Items	Customers	Percent
Meat and Vegetable	272	52
Grocery and Dry Goods	104	20
Clothe and Garment	76	15
Cosmetic and Medicine	34	7
Electronic and Hardware Goods	30	6
Food and Drink	7	1
Total	523	0

Source: Based on Questionnaire Survey.

Distance Decay

Distance affects transportation cost, time span and energy to use. The larger the distance, the longer the time will take and higher the transportation cost. Other things being equal, the customers will buy goods from the nearest market. In Table 5, most of the customers buy the daily needs from the nearest market from their resident or village tract and some their customers buy from far market for selling.

Table 5: Means of Customers Commute to Market

Type of Commute Pattern	Respondents	Percent
Foot	217	41.2
Cycle	108	20.5
Trishaw	50	9.5
Bicycle	46	8.7
Boat	45	8.5
Car	36	6.8
Cycle Taxi	23	4.4
Tawlargyi	2	0.4
Total	527	100

Source: Based on Structured interview, January, 2014 (n= 523)

According to questionnaires, 77 percent of the customers spend less than 15 minutes and remaining spend between 20 minutes and 7 hours. Table 6 reveals in each market that the number of customers decrease with increasing distance within the customer's resident and market. Generally the market with smaller number of shops like South Ywagyi Market, attract customer living only within distance while more shops, for example Myoma and Mayyu markets attract customer both within and longer distance.

Table 6: Location of Customers with Respect to Market

No.	Markets	Near	Far	Total
1	Myoma	150	71	221
2	Mayyu	27	22	49
3	Navy	34	6	40
4	Chatawpyar	23	2	25
5	Minzan	23	0	23
6	Konetan	22	2	24
7	Sanpya	22	2	24
8	South Ywagyi	21	2	23
9	North Ywagyi	26	4	30
10	Makyeemyine	29	6	35
11	Mingan	25	5	30

Source: Based on Structured interview, January, 2014 (n= 523)

Analysis from the Point of View of Sellers

Questionnaires surveys were conducted to sellers from 11markets because remaining markets were in limited situation. Altogether data from 540 sellers were collected during the survey. In the study area, 20 markets were classified into 3 groups: large markets, medium markets, and small markets on their functional differences. Large markets include Myoma and Mayyu markets. Medium markets include Navy, Thandawli, Thatkapyin, Bumay and Paryame markets. Small markets are Taychaung, Chatawpyar, Amyinkhun, Darpine, Panlinpyin, Byinphuywa, Minzan, Konetan, Sanpya, South Ywagyi, North Ywagyi, Makyeemyine, and Mingan markets.

The study area reveals the difference in selling types by different markets. Large markets have all types of selling. About 6 percent are retail shops, 12.46 percent in wholesale and 85.47 percent both wholesale and retail. In case of medium size markets, 100 percent of retail shop without wholesale. In case of small markets 94.64 percent are retail shop. Therefore, large markets not only serve the local customers, but also distribute their good for the reseller of other markets in terms of wholesale.

Furthermore, sellers in the study area were asked about the source of their selling materials. Table 7 presents the sources of their selling items. Sellers from small markets bought their selling material from the large markets located within the Sittway Township.

On the other hand, sellers from large markets bought the goods from directly or through companies, Yangon, Mandalay, Buthidaung, Maungdaw and other markets. Sellers from medium size markets have bought their good from various markets directly or through companies, Myoma, Yangon and other markets. This point also supports the function variation of markets within the Sittway Township.

Table 7: Sources of Commodities Sold in Markets of Sittway Township

Levels of Markets	Direct or Company	Yangon	Mandalay	Myoma	Mayyu	Buthidaung	Maungdaw	Others	Total
Large markets	100 (18.3)	232 (42.6)	127 (23.3)	6 (1.1)	0 (0)	3 (0.6)	6 (1.1)	71 (13)	545 (100)
Medium markets	16 (18.1)	6 (10.5)	0 (0)	32 (56.1)	0 (0)	0 (0)	0 (0)	3 (5.3)	57 (100)
Small markets	90 (29.3)	4 (1.3)	2 (0.7)	176 (57.3)	5 (1.6)	0(0)	0 (0)	30 (9.8)	307 (100)
Total	87 (19.2)	66 (14.6)	42 (9.3)	121 (26.8)	25 (5.5)	111 (24.6)	3 (1)	3 (1)	452 (100)

Source: Questionnaire survey to seller in 11 markets.

Note: Large markets include Myoma, Mayyu markets; Medium markets referred to Navy Market; Small markets are Taychaung, Chatawpyar, Amyinkyun, Darpine, Panlinpyin, Byinphuywa, Minzan, Konetan, Sanpya, South Ywagyi, North Ywagyi, Makeyeemyine, and Mangan markets.

Finally, sellers are asked about the estimated location of customer buying in their shops. In small market level, customers come about 45 percent from the same ward where market is located and other ward. About 4.34 percent customers come from within township.

In case of medium market, about 50 percent come from the same ward and within ward of customers come from the study area. Large markets have their customer not only within the ward but from the Sittway Township and other townships related to the study area.

Transportation Infrastructure as a Location Factor of Markets

As observed in chapter, population of each ward alone could not well explain the location of market. It is because, majority of the customers serving by each market are not confined to the ward located by respective market.

Thus, it is necessary to consider the transportation infrastructure of each market. All markets have passed by road and street. Thus, location of Myoma market is originally both waterway and road transport. At present, Myoma Market passes through 2 bus lines with 31 buses and running 2 trips in daily. Furthermore, Myoma Market passes through 5 waterways with 8 boats and 9 private ships (Hi-fine) and running 1 trip in a day. To understand all above point, the number of bus line passing each market of Sittway Township, total number of trip by all passenger vehicles, and total number of passenger passing each market was calculated.

Then, total number of passenger for each bus line was summed up to get the total number of passenger passing each market. Table 8 shows the relationship between markets and number of bus line, and total passenger passing each market. Transportation infrastructure is very important for the location of markets in Sittway Township.

The number of passenger used in this analysis was as follows:

Cycle Taxi	- 1 passengers
Cycle Taxi (carrier)	- 15 passengers
Buses (Dyna)	- 30 passengers
Trishaw	- 2 passengers
Boat	- 500 Passengers
Private ship (Hi-fine)	- 200 Passengers

In case of Myoma Market, 2 bus lines and 2 water ways that connect Ponnagyun, Mrauk U, Kyauktaw, Pauktaw, Minbya, Maypone , Rathetaung, Buthitaung, Kyaukphyu and Taungkup townships and other townships. Thus, this market is not only serve the local people living around the market but also for people living in the Sittway Township and other more distance townships.

Table 8: Relationship between Markets and Transport Facility

Markets Name	Circle Taxi	Circle Taxi (carrier)	Trishaw	Bus	Boat	Private ship (Hi-fine)	1 Trip Passengers	Total Passengers
Myoma	38	50	50	26	8	9	7460	14920
Mayyu	38	50	7	26	-	-	1582	3164
Navy	-	-	-	-	-	-	-	-
Thatkapyin	6	7	0	5	-	-	261	1044
Thandawli	-	-	-	-	-	-	-	-
Taychaung	6	7	0	5	-	-	261	1044
Paryame	38	50	7	26	-	-	1582	6328
Chatawpyar	-	-	-	-	-	-	-	-
Amyinkhun	38	50	7	26	-	-	1582	6328
Darpine	10	15	0	12	-	-	595	2380
Panlinpyin	10	15	0	12	-	-	595	2380
Byinphuywa	38	50	7	26	-	-	1582	6328
Minzan	-	-	-	-	-	-	-	-
Konetan	-	-	-	-	-	-	-	-
Sanpya	-	-	-	-	-	-	-	-
South Ywagyi	-	-	-	-	-	-	-	-
North Ywagyi	-	-	-	-	-	-	-	-
Makyeemyine	-	-	-	-	-	-	-	-
Bumay	6	7	-	5	-	-	255	1020
Mingan	4	8	-	7	-	-	330	1320

Source: Field Survey and Office Data (Sittway City) (January, 2014).

Analysis on the Spatial Distribution of the Market

From the geographical point of view, the shops and markets are neither clustered nor uniformly distributed. In order to know the spatial distribution of markets, “Nearest Neighbours Analysis” is used. The calculated value by the formular concerned is expected mean distance 0.02, Nearest Neighbour Ratio 0.89, Z score - 0.98 and probability value is 0.32. Figure 9 shows that the distribution of 20 markets in the study area is random, rather than cluster or

uniformly distributed. In this analysis the distribution pattern of Sittway Township is shown by using data obtained from market department, Sittway Town Development Committee, the controlling factors of market location is found out by using data collected from questionnaire surveys to sellers, structured interviews to customers.

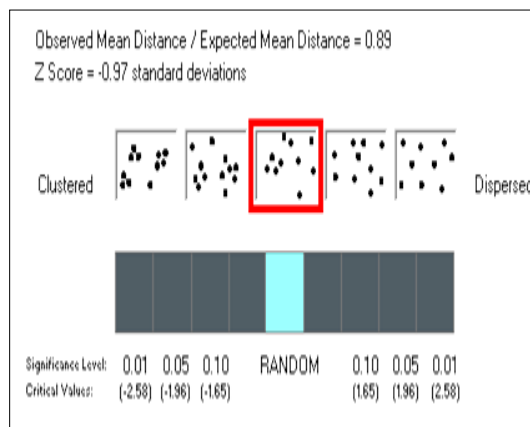


Figure 9: The Result of the Nearest Neighbour Analysis of the Markets Distribution in Sittway Township

Source: Market data are derived from Market Department, Sittway Town

Conclusion

Sittway Township consists of seven townships in the Rakhine State, which comprises 32 wards and 27 village tracts. It is mainly composed of alluvial plain. It is built up by Mayu, Kalandan and Lemyo rivers. This plain is well known Sittway Plain.

Sittway Township has 2 permanent markets and 18 street vendor markets. Type of shops also varies in each market. The level of markets is based on the type of building and items sold in the market. In this categorization, Myoma (New Municipal) Market sold all items and Mayyu Market sold only 3 items, these markets are brick buildings. Therefore, these markets are known as high level markets. All street vendor markets sold basic items needed and are constructed with brick, timber, bamboo, dhani and iron sheets. High level markets are sometimes closely located to low level markets.

Type of shops also varies in each market. Table 1 shows shop types of permanent markets. Myoma (New Municipal) Market comprises 118 meat, fishes, prawns and vegetables shops, 395 grocery and dry goods shops, 146 clothes and garment shops, 73 medicines and cosmetics shops, 24 hardware and electronic goods shops and 94 others shops. Mayyu Market includes 18 meat, fishes, prawns and vegetables shops, 5 grocery and dry goods shops, 126 clothes and garment shops, and 1 other shop.

In general, Myoma (New Municipal) market has all types of shop while Mayyu Market is occupied three types only. 18 street vendor markets also vary in terms of the number of shops. Paryame Market has the largest number of shops and South Ywagyi Market has the smallest number. Markets with wider market areas have larger number of shops in Table 2. By using ArcGIS 9.3 software, above data were depicted as distribution figure for visual and preliminary analysis.

Therefore, **Hypothesis 1** “Spatial distribution of market is variable in size and function within the study area” is accepted.

Second research hypothesis is related to the controlling factors of market distribution variation. In other words, it is concerned with location factors of markets in the study area. There are four major controlling factors of markets location: customers, sellers, infrastructure (accessibility to market) and government policy.

Markets are systematically (level and function) distributed in Sittway Township. Some markets serve the residential wards, while others serve the whole township of even more wider region, including other townships near the Sittway Township. In the study area, 20 markets were classified into 3 groups: large markets, medium markets, and small markets on type of building and items sold in the market. Large markets include Myoma and Mayyu markets. Medium markets include Navy, Thandawli, Thatkapyin, Bumay and Paryame markets. Small markets are Taychaung, Chatawpyar, Amyinkhun, Darpine, Panlinpyin, Byinphuywa, Minzan, Konetan, Sanpya, South Ywagyi, North Ywagyi, Makyemyine, and Mingan markets.

Above distribution patterns cannot explain the population served, but customer's preference based on buying items. Questionnaires surveys were conducted to customer preference in various markets. 523 customers were

interviewed from 11 markets. Firstly, customers were asked about the items that they were going to buy. 272 out of 523 respondents (52 percent) answered that they are buying meat and vegetables, 104 persons (20 percent) of customer are buying grocery and dry goods, 76 persons (15 percent) are buying the clothe and garment, 34 persons (7 percent) are buying cosmetic and medicine, 30 persons (6 percent) are buying electronic and hardware goods and 7 person (1 percent) buying food and drink in Table 4.

Sellers also vary in each market, in terms of type of sale (retail and wholesale), selling items and sources of commodities purchased. Questionnaires surveys were conducted to sellers from 11markets because remaining markets were in limited situation. Altogether data from 540 sellers were collected during the survey. Table 7 presents the sources of their selling items. Seller from small markets bought their selling material from the large markets located within the Sittway Township. On the other hand, sellers from large markets bought the goods from directly or through companies, Yangon, Mandalay, Buthidaung, Maungdaw and other markets.

Transportation infrastructure is needed for each market, because all markets are connected by roads and streets. Thus, location of Myoma market is originally both waterway and road transport. At present, Myoma Market passes through 2 bus lines with 31 buses and running 2 trips daily. Furthermore, Myoma Market passes through 5 waterways with 8 boats and 9 private ships (Hi-fine) and running 1 trip per day. To understand all the above points, the number of bus lines passing each market of Sittway Township, total number of trip by all passenger vehicles, and total number of passenger passing each market was calculated (Table 8).

Location of 20 markets in Sittway Township is assessed by Nearest Neighbours Analysis method revealing randomly distributed and it can effectively explain by means of accessibility (Figure 9).

These are **Hypothesis 2** “These variation are operated by demand, supply, infrastructure and government policy” is accepted.

Therefore, the growth of population, good accessibility and increase vehicles in Sittway Township may generate medium and low level markets to high level market. Furthermore, if deep sea port will be completed in the near future it can grow to large level market in the study area.

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References

- Land Records Department (2013-14): **Facts and figures of Sittway Township**, (Rakhine State).
- Ministry of Immigration and Population (2013-14): **Total population of Sittway Township**.
- Sittway City Development Committee (2012-13): **Register of immoveable property**.
- Sittway City Development Committee (2013-14): **Register of shop room**.
- Zaw Lin Aung (2001): **Physical geography of the Stittway Township**, (Term paper submitted to the Department of Geography, Sittway University).