博 士 学 位 論 文

COLONIZATION INFLUENCES TOWARDS INCONFORMITY OF LAND USE AND TRANSPORTATION IN DEVELOPING COUNTRIES

途上国における植民地化が土地利用と交通の不整合に与える影響に関する研究

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ABSTRACT

Urbanization, migration, population issues, traffic congestions, squatters, environmental deprivation, urban poor and so many more problems related to land use and transportation has occurred in developing countries. These problems are said to be the result of economy deficiency in developing countries. Therefore, economy improvement is given much attention rather than planning over appropriate land use and transportation. Clearly, factors to land use and transportation problems have led to more misperception. This research seeks factors influences land use and transportation problems in developing countries. In addition, this research also investigate reasons to this problem occurred in developing countries and reasons why it has happened in developing countries. ***Chapter one*** of this research explains the objectives, goal and structure of this research. It also clarifies on the flow and the connection between thesis chapters.

Gradually, developing countries cities grow from small town then expand to cities through development and rapid use of automobile. In brief, for developing countries, the needs of achieving economy progress are given most attentions as part of development needs. Accordingly, problems such as traffic congestions and squatters often occurred as result of reckless poor planning between land use and transportation. At the same time, automobile industries flourish in developing countries and has shaped the use of automobile thus extends more problems. The dependability of people towards automobiles continues to cultivate as poor public transportation in developing countries remains unattended by the government. For that reason, the concept of developing countries and the relationship between land use and transportation is described in ***Chapter Two***.

It is not exceptional, developed countries also faced problems in land use and transportation. Although focus of developed countries has shifted from economy to social and natural threat, developed countries also need to plan for sustainable land use and transportation planning. ***Chapter Three*** of this thesis writes about Japan City Planning strategy in balancing the needs of land use and transportation system. Learning from Japan strategy, developing countries needs to understand the planning between land use and transportation. This is to understand the factors involves for proper land use and transportation planning as to avoid more urban problems from happening.

How far economy factor contribute to land use and transportation problems? ***Chapter Four*** of this thesis explains on the result of survey conducted to understand the problems of land use and transportation in developing countries. Factor Analysis is used to simplify and understand reason contribute to land use and transportation problems in developing countries. Based on hypothesis, this research suggests land use and transportation problems in developing countries can be cause by colonization. Colonization can differ factors contribute to land use and transportation problems because it is able to influence the town planning system and also it has delay development as result of deferral in independence.

Equally important***, Chapter Five*** of this thesis further explains on respondent's open ended answers in the influence of the factor in land use and transportation problems. Using Text Mining Analysis, this research found problems of land use and transportation are not mainly caused by economy factor. Instead, there are many other important factors namely political factor, difficult policy implementation, law, knowledge and skills among people as well as lack of information. Based on the analysis, problems of land use and transportation in developing countries can be caused

by other factors although economy has improves. Therefore, it is also important for developing countries to focus on other matters other than economy such as improvement in integration, knowledge, research and also human skills. The understanding of the government to provide good public transportation, reduce dependability of people towards automobile and also avoiding land use planning based on automobile are also vital for developing countries. Hence, economy factor is not the main factor determining problems of land use and transportation after all in developing countries.

As many known, developing countries are countries later gain independence and many actually gain freedom after the World War 2 ends. These countries are now gradually improving and building up their country and that is why economy became the focus of the country. ***Chapter Six*** of this thesis explain on the influence of colonization in current land use and transportation problems in one of developing country town development. As automobile number grows, town that was design and planned during colonization must adapt to current situation. Therefore, based on the town characteristic, town must be planned effectively to avoid problems as result of two styles of town planning.

Chapter Seven of this thesis recommends integrated and alternative transport mode for developing countries. Step by step transport system should be introduced based on the growth of the developing countries itself. As economy improves, bicycle can be used as alternative transport mode and it can be integrated with Bus Rapid System (BRT) and gradually change to Light Railway Transit system suited to the needs and urban form condition. The integration between automobile and non-automobile transport mode should be the focus of intention for all developing countries.

Lastly, ***Chapter Eight*** of this thesis concluded problems of land use and transportation among developing countries and has found differences between the countries problems through colonization factor. Subsequently, it is important to distinguish the differences among developing countries to solve land use and transportation problems. Colonization factor has actually influence land use and transportation problems but it does not limit the effort to improve land use and transportation problems. In summary, it is most important to understand that economy is not compulsory a benchmark for developing countries shifting from developing to develop. There are other main factors must take into consideration for the success of land use and transportation planning among developing countries.

ACKNOWLEDGEMENT

"In the name of Allah, the Most Merciful and the Most Gracious"

The issue of land use and transportation in developing countries is closed to me personally. Hence, completing this research by knowing the real problems of land use and transportation and deliberate that there are differences between developing countries enlighten me in many ways.

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Thank you very much.

CHAPTER ONE
INTRODUCTION TO RESEARCH

1.0 Introduction

Land use and transportation research is fundamental to conduct as the integration between them often unsuccessful to understand. The integration between land use and transportation are challenging hence it is important to carry out a research deepening our understanding on this topic. In order to understand the connection between them, it is equally important to understand the problems too. Land is excavated, develop and redevelop again to meet the necessities of human desires. As the number of world population increase, human make use of all spaces and land available. Most of the time, the extensity of physical development has overcome the principles of sustainable development especially in countries where economy growth is given priority. Therefore, problems such as urbanization, rural urban migration, traffic congestions, squatters, environmental deprivation, urban poor and so many more related to land use and transportation has occurred in developing countries.

In developing countries, land use and transportation problems are not left out. In these countries, economic growth is put forward before anything else. This is because, economic growth is so important for the country to develop. Many have claims problems in economy contribute to poor planning and could not solve their problems in land use and transportation. It seems that with the improvement of the economy, it will solve all problems. No wonder economy is given so much priority. How far is this true? Can we accept the main factor contributes to land use and transportation problems are because of economy? So, does the improvement in economy growth will provide

improvement in land use and transportation planning? The reality is now many developing countries are growing in an exponential graph. However, many countries failed to plan for sustainable land use and transportation planning. So, land use and transportation problems still occur. Consequently, it is very essential to understand the factors contribute to land use and transportation problems in the developing countries. This is to recommend method to solve land use and transportation problems. The failure to plan over proper planning necessities not only touches the aspect of physical damages to the city but also human behaviour (Lee and Moudon, 2004, Fox, 1995). So, land use and transportation planning in deed an important element of a country growth.

Land use and transportation problems can happen anywhere in any regions of the world. Develop countries like United States and Japan also faces problems in land use and transportation (Cervero, 1989, Ewing et.al, 2003, Koike et.al, 2003, Koike et.al, 2005). As well-versed, economy factor is still resuming being important for any government development. According to Cervero (2013), developing countries monocentric pattern of development through its economy development focus in urban areas may contribute to the problems in land use and transportation planning.

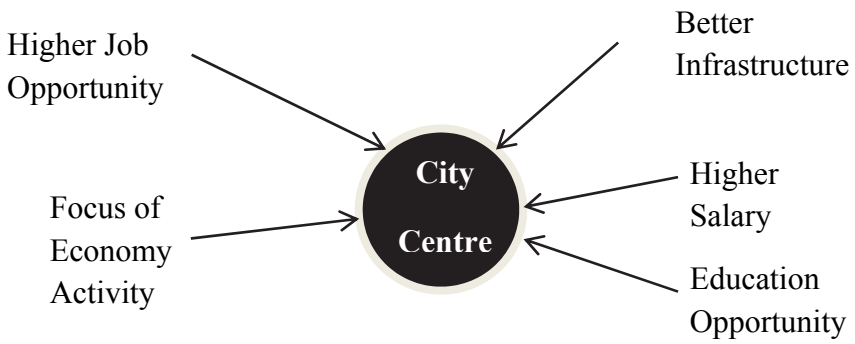


Figure 1.1: Cervero (2013) stated many developing countries are more monocentric

Compared to develop countries, the factors differ developing countries from develop countries land use and transport are through urban form, density, decentralization, poor road hierarchies and spatial mismatches. Developing country urban forms that tend to concentrated at urban areas contributed to congestions problems in the urban core. So, what are the real factors affecting land use and transportation problems in developing countries? Do they vary from each other and what are the reasons for the constant problems?

Developing countries occupies more than 50% of the total countries throughout the world. Many developing countries such as China, India and Brazil are going stronger in economy and becoming at par with develops countries. Instead, there are also developing countries having severe problems in economy growth. The state of their land use and transportation condition in developing countries are also worrying and develop country strategy seems unfit to many developing countries condition. Although economy level are different, land use and transportation problems seems to occur in any developing countries. Regardless of the economy growth, land use and transportation problems still happen. Why this problem is does still happen even though there are economy improvements? Is there any other reason behind it?

Developing countries consist of countries with upper middle income to least income. Besides, developing countries also consists of countries with various backgrounds especially in its town planning history. Additionally, developing countries also consists of countries that were colonized during the First World War or the Second World War. Some of the countries just gained 10 to 20 years of independence as they are still colonized after the world war ends.

1.1 Research Gap

As we all know, developing countries are currently in the midst of rapid development. The constant and the difficulties to solve land use and transportation problems in developing countries encourage this research to be conducted. Nonetheless, there is no certain benchmark or references to determine what is wrong and what is right based on history because history remains as history. No standard guidelines or reference can be made to justify the influence of colonization towards current land use and transportation problems especially in developing countries. As many developing countries were once colonized, it is important to understand the influences of colonization in the current land use and transportation problems. If it is possible for the two different style of town planning to be contradict and has affect to the current land use and transportation problems. As far as this research concern, there are few research relates to colonization with land use and transportation problems and researcher could not find any of the research related to developing countries. Therefore, the significant of the research are:

a. The actual factor contribute to land use and transportation problems in developing countries.
b. Connection and influences of past colonization to the current land use and transportation problems.

According to Barter (2000), land use patterns in developing cities after the post war decades shaped the post war transport patterns. Looking back at the history, colonization has occurred in most developing countries. Besides being colonized, these countries have inherited colony planning style. The influences of colonization however could not be denied in developing countries. However, it depends on how deep

colonization has rooted in the country and the extensity of the influences. It is also depends on the current independence government to move on from using colonial style towards the new government style. The important of these research findings in colonization influences as to understand the condition as to solve land use and transportation problems. When we know more about the background of the problem we could understand better on how to solve the problem. It is also important so that developing countries don't solely focus on economy improvement as a solution to land use and transportation problems.

Respondents of this research are professionals of land use and transportation planning from many developing countries. The time period of data collection and the background of the respondents in land use and transportation problems made this research genuine. Based on their response, this research then conducted multivariate analysis to understand the problems of land use and transportation in developing countries. The responds are taken from survey from the year 1999 until year 2012 during a program conducted by Japan International Cooperation Agency (JICA) each year. Respondents in this survey are professional who involved directly in land use planning, land use development and policy, transportation planning and policy in their country. The analysis and findings are clarified in chapter four, five and six of this thesis. While chapter two, three and seven are works reviews to support the research findings.

1.2 Review of existing papers

Land use and transport problems are widely discussed by many researchers to list a few (Gakenheimer, 1993, Ding, 2003, Leinbach and Sein, 1999, Cervero, 2000, Cervero, 1989, Ewing et.al, 2003, Koike et.al, 2003, Koike et.al, 2005). It is common anyway, to find developing country relationship to land use and transportation is influence by economy factor. According to Cervero (2013), economy factor plays a role in developing countries land use and transportation problems. Cervero (2013) studied that planning over integrated land use and transport must be pro poor hence understanding the needs of people in developing countries. Gwilliam (2003) stated that weaker policy contribute to urban transport problems in developing countries. This is supported by Gakenheimer (1999) stated that policy making is important in controlling problems in rapid motorization occurs in developing countries. In addition, Barter (2004) finds a policy or planning strategy that supports the automobile development will direct to the expansion of automobile dependability thus explaining to us the importance of policy factor in the problems of land use and transportation.

The failure of transportation plans and poor land use planning can affect the quality of life (Downs, 1999, Newman and Duncan, 1979, Ewing, 2008). However, as times passes and as economy gets stronger does these problems consistently existed? Or does it vanish and improves over time? According to Homes (2013), British as colonizer not only colonized but a creator of towns. Many of developing countries are colonized by the British so it is important to see if these towns suffer land use and transportation problems as result of their planning. Table 1.1 elaborates more other additional significant research related to land use and transport. Further literature reviews are written in the second chapter of this thesis.

Table 1.1: Significant research related to land use and transportation problem in developing countries

References	Aspects of land use and transportation
Reasons for land use and transportation problems	
Shariff (2012)	Spatial arrangement of urban fabric and other determinants such as **government policy, government vehicle financing, household and travel characteristic becoming more important** than income in determinant of private vehicle in Malaysia.
Barter (2000)	Public policy in transport decision makers in Asian relates to the problems of **poor public transport, traffic problems and lack of investment fund**. Post war: reflected transport patterns and shaped urban land use patterns creating centralised, high urban densities, mixed land used and commercial activity along major roads.
Acharya (2005)	Decline modal share of public transport as result of **delayed investment and direct policy**.
Nawi et. al (2013)	Passenger car sales in Malaysia are related to **GDP, interest rate, consumer price index, exchange rate and unemployment rate.**
Mohamad and Kiggundu (2007)	Private car ownership in Malaysia is not controlled because of **poor policies, strong motorcar industry and public transport deficiency.**
Aldukali et. al (2011)	Transport policies in developing countries fail because of **lack of proper planning; mixture of traffic roads and the affordability of car ownership** worsen by lack of public transport facilities and parking spaces.
Newman and Kenworthy (1996)	**Political authoritative** and in developing countries contribute to traffic issues in developing countries.
Kutzbach (2009)	**Rising income, travel time, policy relates to the rise in car use** and decline in bus use in in developing countries.
Daimon et. al (2007)	**Establishment of policy** is need to coordinate relationship between land use and transportation to form high density urban area as to keep trip length shorter and using public transport for longer trips.
Hook and Replogogle (1996)	Growth in motor vehicle ownership not necessarily outcome of GDP and incomes but **influenced by public policies, transportation subsidies and system**.
Luo et. al(2007)	Relocation of high income people in city area contribute to the high used of car in the city.
Rabinovitch (1996)	**Land use planning, economy development policy, public transport efforts and policy contribute** to success of Curitiba land transport integration.

Developing and developed country is different	
Evren and Akad	Planning made in USA and European countries is questionable to apply in developing countries due to **different institutional framework.**
Bose (1998)	Develop and developing countries strategies should differ as developing countries are **needs of cost effective solutions**.
Gwilliam (2003)	Developing country cities is **absence of political organization** that contributes to the problem of **policy reform in managing public transport.**
Gakenheimer (1993)	There are conflicts of land use and transportation planning orientations. Transportation and land use strategies to alleviate congestion can be done through **increase capacity, improve traffic flow and the encourage use of auto trip reduction**.
McCoubrey (1988)	English planning model was used in wide range of developing countries however are **not suitable in the current developing countries condition due to industrialization society and rapid urban growth.**
Homes (2013)	British colonialism influences many of their colonies especially in the process of urbanization. It has **inherited the colonial situation, approaches and continues the tradition of colonial into the current society** inheriting social segregation affecting the kind of current planning.

1.3 Research Focus

This research is focus into problems of land use and transportation in developing countries. Multivariate statistical analysis is used to define variations of problems existed. Developing countries have different history, culture, social structure, population, religion, political belief and many more. Therefore, solving land use and transportation problems could not be solve by just improving economy as economy factor also contributes to the problems of land use and transportation. Hence, this research is also focus into findings why problems of land use and transportation occur in developing countries and does it contributed by colonization reasons. Currently, there is no other specific research conducted towards land use and transportation problems in developing

countries related to influence of colonization. The originality of this research is to prove the linkage between colonization influences with land use and transportation problems in developing countries. Planning history is often neglected in the research of urban and regional planning or often compromise although history formed as based for countries growth. In fact, there are developing countries grow from the shadow of the first world countries. Soon as they claim independence, tradition continues and we are wondering if the many land use and transportation problems occur in the country are results of the colonization influences?

1.4 Research Objectives

The purpose of this study is to understand the problems of land use and transportation in developing countries. The study will analysed the factors involved in the problems of land use and transportation in developing countries. The objectives are:

a. To recognize the problems of land use and transportation in developing countries.
b. To investigate reasons contributes to the problems of land use and transportation in developing countries.
c. To clarify the differences of land use and transportation problems in developing countries based on hypothesis.
d. To gives recommendation of improvement land use and transportation based on many land use and transport condition of developing countries.

The flow of this research is described as chart 1.1 explaining the relationship between the chapters and also the methodology used to achieve the objectives of this research.

1.5 Flow Chart of Research

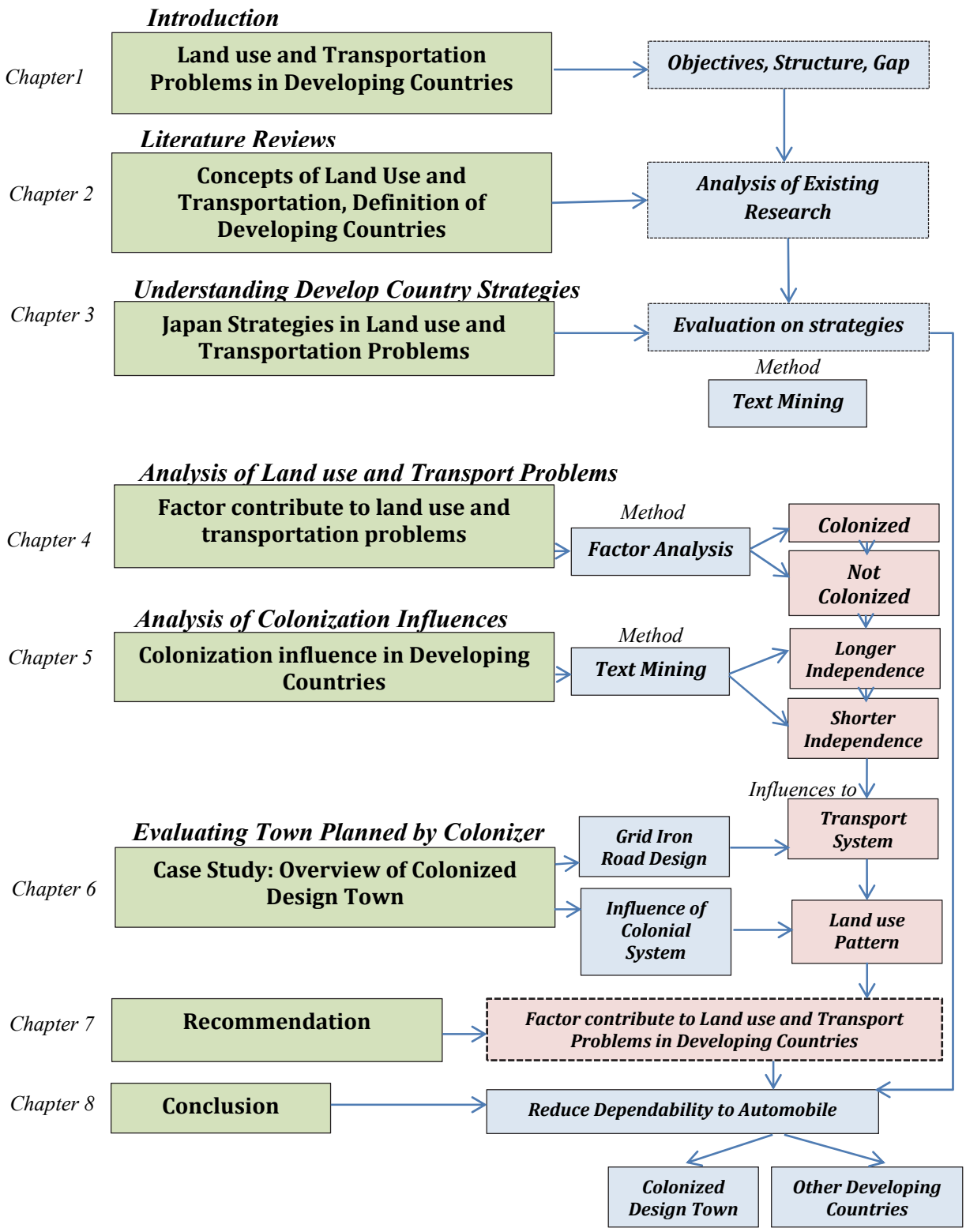


Chart 1.1: Flow of the research

1.6 Research Structure

Chapter one of this research explain the needs to study the problems of land use and transportation in developing countries. This is due to the increase problems of land use and transportation in developing countries. Worsening, developing countries seems to follow the trend of develop country. One of the reasons contributed to the pattern is the methods of solving land use and transportation problems adapted from develop countries. In this chapter, the flow of this research is stated in this chapter for guidance of other chapters throughout this thesis. In addition, chapter one will also detailed out other researches related to land use and transportation problems in developing countries. The originality of this research is based on the uncovered sections of other researches related to land use and transportation problems in developing countries based on own hypothesis.

Chapter two will explain in further the necessity of conducting this research and the philosophy involved in this research. As this research will be narrowed among developing countries, this chapter will explain the definition of developing countries, the relationship between land use and transport as well as the needs of studying the variation of land use and transportation problems among developing countries. In addition, this chapter explain the urban pattern relationship to transportation and how transportation can be planned based on the existing urban pattern.

Chapter three is written based on author paper published in Urban Planning Design Research on “Comparative Study on Reconstruction Plan of Town after the Great East Japan Earthquake”. The application of this paper into this research is to further understanding the land use and transportation of Japan. This chapter explain into the Japanese land use and transportation system existed in solving the problems of land

use and transport especially in balancing the needs of social and natural hazards. This is important to give knowledge and information on how developed country like Japan solving problems of land use and transportation.

In seeking the originality of this research, *chapter four* will explain the empirical findings of this research. This chapter is also written based on the author paper titled "The Measurement of Land use and Transportation Planning Success in Developing Countries Based on Comparative Analysis" presented in the 2013 EASTS Conference in Taiwan. This chapter includes data analysis of respondents from developing countries professionals on land use and transportation problems in their respective countries. This research finds colonization factor differ developing countries condition. Using the Factor Analysis method, respondent's results are grouped into significant easier data interpretation.

Chapter five will then explain on the influence of colonization through independence time. Longer independence time means to have different problems from developing countries compared to shorter independence. This chapter is also written based on author paper title "Factors Determining Land use and Transportation Planning Achievement in Developing Countries" published in Sustainable City book and presented in the 2013 WESSEX Conference held in Putrajaya, Malaysia. Using text mining methodology is used to pick up frequent words appear in the respondents explanations on land use and transportation problems in developing countries.

In order to make clear about colonization influences to land use and transportation problems, a case study is selected in a developing country. This is a preliminary survey explained in *chapter six* of this thesis. Taiping town located at the North part of Peninsular Malaysia is chosen as the case study to understand the

condition of town which is originally planned by the British during colonization period. The preliminary survey although not representative of all developing countries may provide a clue and make clearer about colonization relationship with land use and transportation problems in developing countries. Taiping town located in Malaysia is chosen based on the characteristic of original modern town developed by the British colony. In addition, this is to understand the influence of colonization towards current land use and transportation problem. This is because, colonized road pattern layout and land use pattern are used by current local residents.

Chapter seven of this thesis suggests recommendation to reduce people dependability to private vehicles in developing countries through implementation of integrated alternative transportation system based on different condition of land uses. Finally, in *chapter eight* of this thesis summarizes the concepts, findings and result of this thesis. Based on the findings and result analysis, future works and possible application of this research is suggest accordingly.

CHAPTER TWO
CONCEPTS ON LAND USE AND TRANSPORTATION IN DEVELOPING COUNTRIES

2.0 Definition of developing country

It is important to understand the definition of developing country. The creation of developing country terminology is based on the economy factor. As the world classify countries into develop, developing and least develop according to economy level, it is also important to study standards use in developing countries land use and transportation. The definition of developing country is basically created to benchmark development achievement of a country. Since, there are many factors of a country development; the definition is often futile to achieve a definite meaning. According to the World Bank, the definition of developing country is referring to the Gross National Income (GNI). The International Statistic Institute (ISI) is using the World Bank terminology on defining developing countries.

According to the CIA World Fact book (2012), developing countries term is based on the International Monetary Fund (IMF) definition. The IMF also listed developing countries based on its country hierarchy in economy achievement. It is very controversial for many countries defining themselves to be under the category of developing or develop. However, it is very clear to us that countries of the world are commonly classified into developed or developing countries based on the level of its economy. How many developing countries listed by these organizations in the world? Table 2.1 consisting categories of all developing countries based on the OECD definition of developing countries economy.

Table 2.1: Categories of developing countries as referred by OECD and JICA

Least Developed countries	**Other Low Income Countries**	**Lower Middle Income Countries and Territories**	**Upper Middle Income Countries and Territories**
Afghanistan	Kenya	Armenia	Albania
Angola	Korea	Belize	Algeria
Bangladesh	Kyrgyz	Bolivia	*Anguilla
Benin	Tajikistan	Cameroon	Antigua and Barbuda
Bhutan	Zimbabwe	Cape Verde	Argentina
Burkina Faso		Congo	Azerbaijan
Burundi		Cote D Ivo ire	Belarus
Cambodia		Egypt	Bosnia and Herzegovina
Central African Rep.		El Salvador	Botswana
Chad		Fiji	Brazil
Comoros		Georgia	Chile
Congo		Ghana	China
Djibouti		Guatemala	Colombia
Equatorial Guinea		Guyana	Cook Islands
Eretria		Honduras	Costa Rica
Ethiopia		India	Cuba
Gambia		Indonesia	Dominica
Guinea		Iraq	Dominican Republic
Guinea Bissau		Kosovo	Ecuador
Haiti		Marshall Islands	Macedonia
Kiribati		Micronesia	Gabon
Laos		Moldova	Grenada
Lesotho		Mongolia	Iran
Liberia		Morocco	Jamaica
Madagascar		Nicaragua	Jordan
Malawi		Nigeria	Kazakhstan
Mali		Pakistan	Lebanon
Mauritania		Papua New Guinea	Libya
Mozambique		Paraguay	Malaysia
Myanmar		Philippines	Maldives
Nepal		Sri Lanka	Mauritius
Niger		Swaziland	Mexico
Rwanda		Syria	Montenegro
Samoa		*Tokelau	*Montserrat
Sao Tome and Principe		Tonga	Namibia
Senegal		Turkmenistan	Nauru
Sierra Leone		Ukraine	Niue
Solomon Islands		Uzbekistan	Palau
Somalia		Vietnam	Panama
South Sudan		West Bank and Gaza	Peru
Sudan			Serbia
Tanzania			Seychelles
Timor Leste			South Africa
Togo			*St. Helena
Tuvalu			St. Kitts Nevis
Uganda			St. Lucia
Vanuatu			St. Vincent and Grenadines
Yemen			Suriname
Zambia			Thailand
			Tunisia
			Turkey
			Uruguay
			Venezuela
			*Wallis and Futuna

*Territory

The lists are basically are almost the same between the agencies depending on economy growth of the respective year. The Organization for Economic Co-operation and Development or OECD similarly has their own list of developing countries. Agency like Japan International Cooperation Agency or well known as JICA is also using the OECD definition on developing countries based on country GNI in defining and assisting developing country. Basically, JICA divided all developing countries into 4 categories that are least developed countries, other low income countries, lower middle income countries and upper middle income countries. This is to establish the ranking of economy and the type of assistants needed. JICA is using all categories in defining developing countries list in assisting developing countries development. The list is used in assisting and giving the official development assistance or well known as ODA. The upper middle income countries is based on per capita GNI $3976 - $12 275 (in 2010) while other lower income countries is define by per capita GNI lower than $1005 (in 2010). In short, JICA refer to the ODA list by OECD in defining the list of developing countries.

Developing countries urbanization rates is expected to rise in 2050. According to Rodrigue et. al (2013), 90% of current urban growth occurred in developing countries. As comparison between developing countries, the urbanization population does not limit to colonization factor. As a comparison, Malaysia urbanization population is at 72% almost equal to Mexico urbanization population that is about 78%. Urbanization occurred for several reasons; one of them is the increase of rural urban migration. Rural urban migration occurs as result of imbalance job opportunity and industrialization growth in urban areas. The increase of urbanization also shaped the land use pattern of developing countries, expanding urban lands as population in urban areas getting higher.

In addition, transportation also needs to accommodate the increase of urbanization population. The failure to provide efficient and sufficient transportation system creates problems in land use and transportation in developing countries. Suzuki et. al (2013) stated that automobile dependent sprawl as income rises. Luo et. al (2007) also agrees to the rising income influence to the increase of automobile used in developing countries. In contrast, Kenworthy et. al (1995) stated that rising income is not necessarily associated with increase in automobile as planning policies must be non-automobile mode to avoid automobile dependency. Table 2.2 shows urbanization population between developing countries that was colonized and non-colonized after the World War 2.

Table 2.2: Urbanization population of several developing countries in the world

Status after World War 2	Name of country	Urbanization population in 2010	Average Total Population
Colonized Developing Country Group	Bangladesh	28%	154.7 million
	India	30%	1.237 billion
	Malaysia	72%	29.24 million
	Sri Lanka	14%	20.33 million
	Zimbabwe	38%	13.72 million
	Algeria	66%	38.48 million
	Vietnam	30%	88.78 million
	Indonesia	44%	246.9 million
Non-colonized Developing Country Group	Brazil	87%	198.7 million
	Bolivia	67%	10.5 million
	China	47%	1.351 billion
	Egypt	43.4%	80.72 million
	Mexico	78%	120.8 million
	Saudi Arabia	82%	28.29 million
	Thailand	34%	66.79 million
	Turkey	70%	74 million

Transportation is also influenced by urban form as urbanization increase. In developing countries, urban form changes as transportation system expands. Through roads, highways and railways expansion, urban boundary expands. Developing

countries urban growth pattern is a result of several factors including economy, political and transportation. According to Newton (1998), development patterns can be described as dispersed city, edge city, ultra city, compact city, corridor city and fridge city. According to Rodrigue et. al (2013), there are four types of urban spatial structures such as centralized clustered, centralized dispersed, decentralized clustered and decentralized dispersed. The formation of spatial structure creates urban form and it is a result of transportation in shaping the land use pattern. Suggestion to improve traffic congestion must consider the type of urban spatial structures.

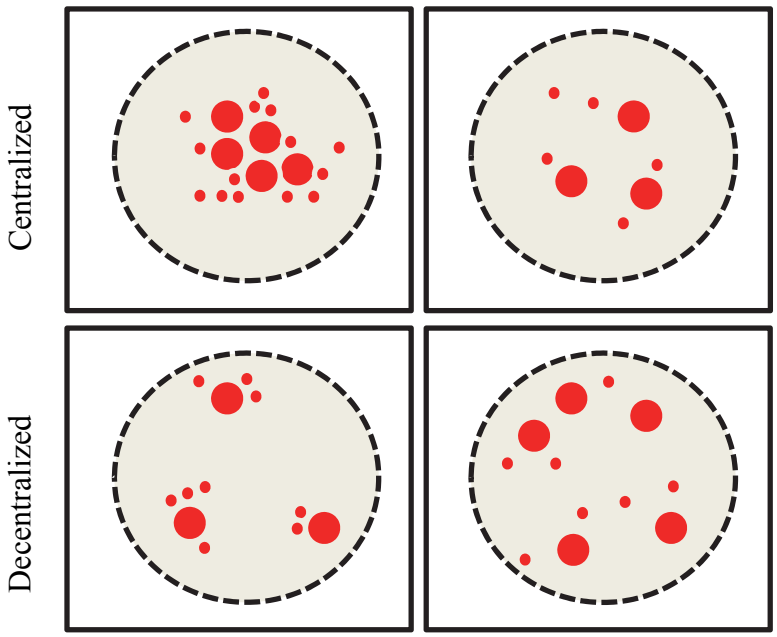


Figure 2.1 : Types of urban spatial structures

Source: Rodrigue et. al (2013)

According to United Nations report in 2001, the rural-urban migrations increase urban population thus shaping the kind of cities in developing countries. In addition, transportation also has decentralized urban areas. As a result, there are few urban spatial structures arisen. The relationship between land use and transportation are closer

although both field are conflicting with each other. According to Gakenheimer (1993), land use planning scales of concern are smaller compared to transportation. The conflict of interest between land use and transportation has making planning of both difficult. As a result, walking cities develop before automobile era tend to conflict after automobile used increase. Thus, the relationship between land use and transportation remains conflicted. By this definition, urbanization and expand of automobile explain the influence of economy factor in land use and transportation. Proven, economy factor contributed to the development of land use and transportation.

2.1 Relationship between land use and transportation planning

The philosophy of this research revives on the idea of investigating the problems of land use and transportation in developing countries. Basically, to achieve a sustainable city, it is important to emphasize on three main values that is social, environmental and economic value. In most developing countries, it is common to focus first on economy success to create stable growth and gain income to the country. This is because, deficiency in economy produces many problems in delivering success land use and transportation planning in developing countries especially in organizing a working infrastructure system. Therefore, many developing countries put economy development as priority. The economy achievement however increases development while problems in environmental and social are less given emphasis. As economy of developing countries is improving, the focus has gradually shifted onto environment and social development to achieve a sustainable development. This includes ensuring a low carbon city, proper waste management, betterment in healthcare and education. The transition of economy factor to other factor is the result of developing status intensification

towards develops countries status as shown in Figure 2.2. Economy is still the main concern in develop countries but scale of concern towards environment and social expanded compares to developing countries where environment and social concerns are influence by scale of economy growth.

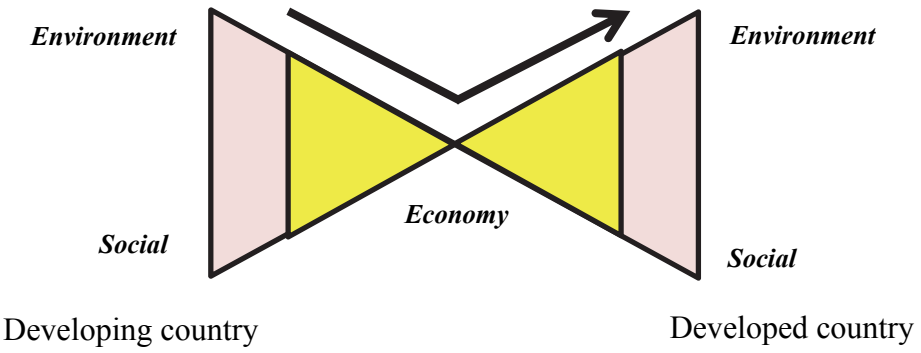
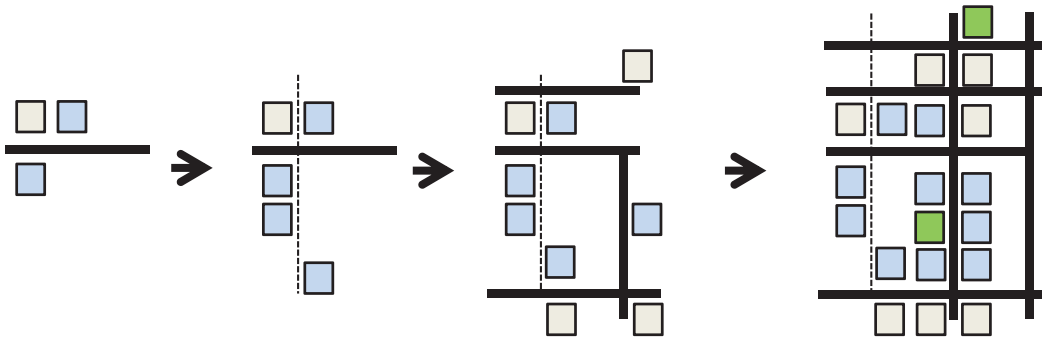


Figure 2.2: Transfer of developing country focus

However, economy growth varies among developing country situation. This reflected in the four categories of developing countries that are least developed countries, middle income, lower middle income and upper middle income. Economy of a country also fluctuated and although it can be cause of urbanization it cannot be a constant factor. Instead, the basic foundation of land use and transportation are formed by the act of balance between the land use and transportation. The failure to achieve balance between the two components will result many problems as faced by current developing countries such as traffic congestions, urbanization and so on. According to Suzuki et. al(2013), the lack of coordination, lack of knowledge among practitioner inadequate policies and regulations and restrictive national regulations besides financial constraints contribute to problems of land use and transportation in developing countries.

The relationship between transportation and land use can be explained through automobile expansion towards urban boundaries. For example, a small town consist of mixed land use that is walkable is zero dimensional expand through the development of railway system. The urban boundaries expand as population increase and dispersing urban boundaries through railway connection. The expansion through public transportation is one dimensions change to two dimensions as automobile used increases. Instead, a good integration between public transport, automobile and non-automobile that are three dimensions are better to improve land use and transportation problems in developing countries.



Zero Dimensions
Walking distance town with mixed land use land use pattern and small population.

One Dimension
Town expand through railway route connecting areas outside town increase population.

Two Dimensions
Town population increase through additional road as automobile use started to increase.

Three Dimensions
Town expand into city as population increases.
Combination of public transport and private cars are better.

Figure 2.3: The expansion and changes of land use as a result of transportation

In this context, we should understand that there is a mutual relationship between land use and transportation that is best translated through the demand and supply concept. Based on the figure, land use planning supply is provided by the services which are normally provided by the government. In accordance, the demand of urban

activity also creates demand in traffic activity. The poor supply of traffic facility and urban facility create unsatisfactory supply for the demands. The circular relationship between supply and demand of the two components proven the relationship subsists between them. Hence, it is important to have balance and integration between land use and transportation despite of the economy level of any developing countries. Based on demand and supply theory the increase demand of vehicle on the road with poor supply of urban facility resulting breakdown of a balance relationship. It is appeared when the balance between land use and transportation collapse.

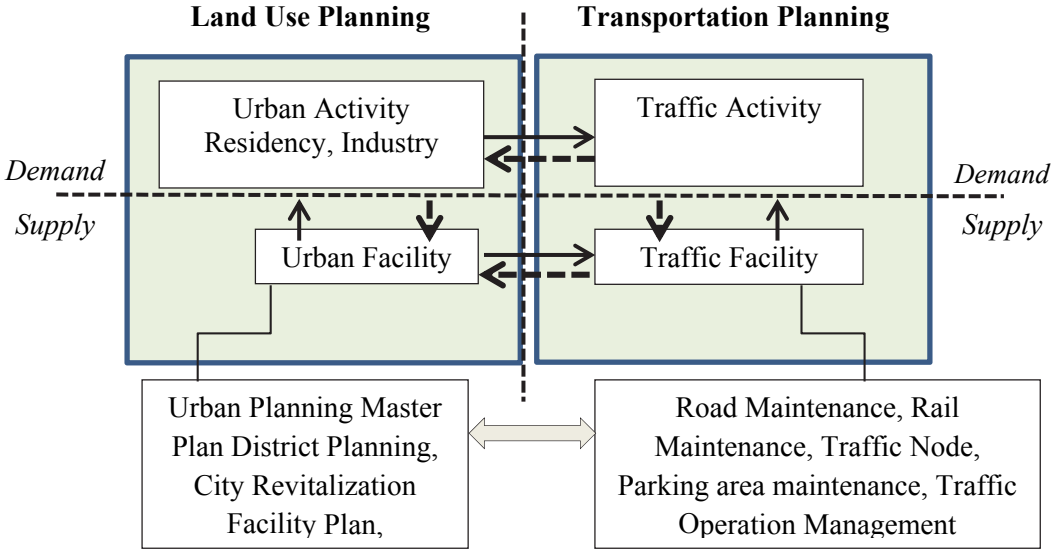


Figure 2.4: showing the relationship between land use and transportation

2.2 Colonization Relation to Land use and Transport

Everything in this world narrates to history. The understanding of the history allows understanding the reason and foundation of a problem. Commonly, focus of developing countries is towards economy and some are now gradually shifted to focus

on environment and social development. Consecutively, land use and transportation balance are achieved through equilibrium of supply and demand of the two components. Furthermore, supply and demand are also dependent onto several other factors in development. For example are demography, politics, and education, skills, law and policy development. It also may vary based on a country history and characteristic. The number of skills for example is depends on the maturity of education and research development of the country. The enhancement of research also influence by the political structure of a country. The political structure has a lot in common with the situation of a country whether it inherited foreign colony system or develop own system. That is why, the study of history is important in understanding why variation of land use and transportation problems exists among developing countries.

According to Homes (2013), British as colonizer not only colonized but a creator of towns. The creation of town is results of British needs and to preserve their health and sanitation. This is translated through the planning of urban areas where different races or groups stays in different areas to create harmony. This has influence the landscape of urban patterns before and after independence of the country. Nonetheless, the scope of history is a big area to cover. This research focuses into the influence of foreign colonization to developing countries land use and transportation problems. This is because colonization influence the time of independence and could also influence system of a country. The reason is to understand the differences in the land use and transportation problems among developing countries as cause by colonization factor either in the system inheritance or the physical planning done during colonization. Currently, there is about 150 countries from 190 countries are considered developing. Figure 2.5 shows developing countries covered 80% of the world.

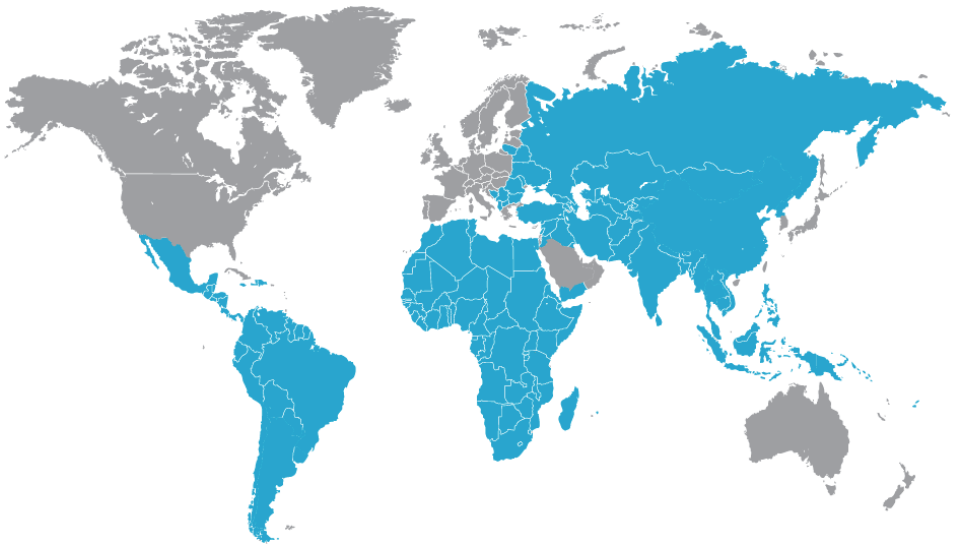


Figure 2.5: Developing countries of the world

Source: OECD

According to Rodrigue et. al (2013), automobile dependency occurs because of subsidy and the disregarded transportation alternatives. This is true as people do not bare the original cost of transportation for example for fuel, people tends to rely on automobile. The lack of efficient public transport and the ease of driving by expanding roads and highway constructions increase the tendency of driving car. The increase of population, migration and used of automobile directs to the problem of congestions. The beginning of developing country terms is commonly based on economy. But, if we look further into each country, each of them displays variety of growth characteristic. Some was never colonized, some was colonized for decades and some country only shaped after the World War 2. Looking at the list, we can also see that developing countries are not only specifying into certain ethnic or region. The range varies from Sub African regions to Asia regions and Central Europe region. This resembles variation of developing countries characteristic are no bias to any specific region only. Besides

economy achievement of these countries, there are different developing countries characteristic.

a. Developing countries are once colonized by foreigner.
b. Developing countries emerged (created) after World War 2.
c. Developing countries are not colonized by foreign colony.

There are other factors that may lead to different level of economy achievement such as political condition, urbanization rate, resources availability, labour force, and percentage of skill workers, education and many more. These factors are very much related to the date of independence or whether it was colonized or not and that influences the strength of the government system. Therefore, economy may not be a good benchmark to examine a developing country land use and transportation system. For example, later independence means a country has shorter time to develop efficient self-governing system for land use and transportation system. Therefore, the intensity of land use and transportation problems could not be define based on economy but must be based on other factors as well.

Developing countries that are once colonized by foreigner means the government system may be probably influenced by foreign system. For example, the formerly Malaysia Town and Country Planning Act resembles the British Town and Country Planning Act. For example, colonization of British influences the town planning style of Malaysia. In addition, roads and buildings constructed during Portuguese and Dutch colonization are still remain in certain parts of Malaysia and currently are preserved as historical buildings of Malaysia. Therefore, we could not deny the influence of foreign colonization into the land use system or transportation system.

The influence of colonization for example in the creation of grid iron road pattern is an example of the colonization influence. In addition, there are contradictions of purposes between previous town planning during colonization and the current town planning after post colonization period. Furthermore, there are also countries that were not colonized for example Thailand, Russia and China. Therefore, the influence of foreign system in the local system in the original land use and transportation system especially before automobile era cannot relate with the influence of colonization. So, there are differences between developing countries as there are developing countries with colonization influences and there are countries without. Hence, is there any differences in the factors contribute to land use and transportation problems?

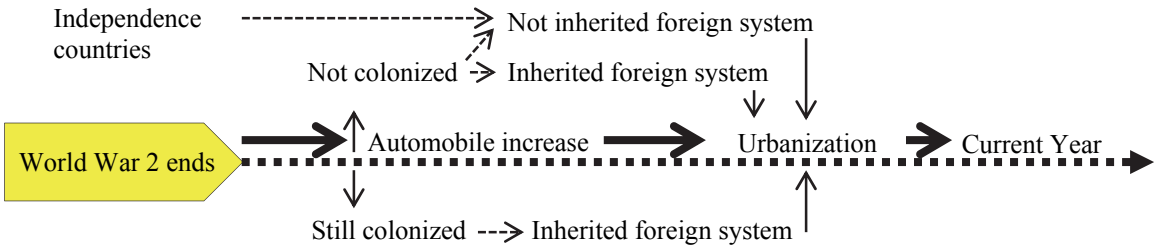


Figure 2.6: Timeline of varies developing countries depending on their independence and colonization influences

2.3 Developing Countries after the World War Two

The colonization theory is rarely discussed in the field of land use and transportation in developing countries. It is due to the rapid development of land use and transportation occurs in developing countries that commonly appear after colonization left the country. However, the traces of colonization modern town development can be found. Shecter and Yacobi (2005) stated that there is an influence of European modernization in Arabic cities at the end period of the Ottoman.

Integration of land use and transportation planning is difficult to accomplish even in develop countries. In India and Jordan, land ownership is an important factor that restricted land use and transportation planning. Lack of financial also causing planning for a transport facility is hard to execute because of government has less control towards the land. Therefore, planning execution is difficult unless strong political can produce strong policy. In certain developing countries especially in the new industrialized developing country, economy is given priority over land use regulations. Therefore, we can understand that there are many factors contribute to the success of land use and transportation planning. Review of related studies will further give us information towards the current situation of land use and transportation planning in developing countries.

Developing countries are unique with varies condition and thus making land use and transportation a challenged task. Currently, developing countries population occupies more than half of the world population. The rise of population is a common issue described in many research to list a few (Hook and Replogle, 1996; Morita *et.al*, 2003; Ocampo *et.al* 2009; Kusbiantoro, 1998). The increase of population also urge for more land to be developed as residential areas. Population could not be control but we can control development size and location to sustain population. This is more suitable to implement proper planning. It is suggested that developing countries will develop thirty three mega cities by 2015 (Gakenheimer, 1997). The expanding cities tell us how important to manage developing countries as soon as possible. Kusbiantoro (1998) stressed about the increase of population that surge the needs of automobile in Indonesia. The large increase in car usage rate was also said in Hayashi *et. al* (2004). All of this fact is related to the rise of economy in developing country.

In addition to that, political factor also plays a similar role to economy. According to Dowall and Clarke (1996), it is important to stress about the method of planning land use policy. This is because, poor land use policy can result uncontrolled land development and the imbalance of land price market. Rakodi (2001) stressed that the inappropriate policies resulted the volume of illegal development exceeding legal development. Government in developing countries are seen to be loose in land use policy thus putting politic interest first. From economy factor to government factor, it is clear that there are many factor discussed and relates to the success of land use and transportation planning in developing countries. But, why such diverse factor exists?

According to Evans (2003), as planning decisions are predominantly ended by the politicians, the effects of the planning decisions are also reflected to the desires of the politicians. In this case, the higher involvement of the politician in the structure of planning, the higher influence of politics towards land use and transportation planning. In order to understand about developing country, it is essential to know the term developing countries. International Monetary Finance (IMF) defines developing country according to the level of economies and analytical standards which comprises export earnings from abroad and external financing sources. In order to achieve economy growth many aspects has been neglected including land use and transportation. This can be seen at many prolong urban problems and lack of balance in planning for proper transport facilities to meet land development demand in developing countries. According to Homes (2013), the cities of developing world has influence the policies of government and development agencies due to colonization. This is translated through the planning of social segregation that influences the urban growth. How colonization

relates to this? Table 2.3 shows colony of colonized developing countries after the World War 2 ends included in this research.

Table 2.3: Showing respondents of this research country colonization status

Colonized Developing Countries						**Non-Colonized Developing**
British	**France**	**Portugal**	**USA**	**Soviet**	**Netherlands**	
Bangladesh	Algeria	Mozambique	Philippines	Mongolia	Indonesia	Albania
Bahrain	Cambodia					Brazil
Ethiopia	Cameroon					Bolivia
Ghana	Laos					Colombia
India	Syria					Chile
Kenya	Vietnam					China
Malaysia						Egypt
Malawi						Haiti
Myanmar						Jordan
Palestine						Mexico
Senegal						Nepal
Sri Lanka						Panama
Tanzania						Peru
Uganda						Saudi Arabia
Zambia						Thailand
Zimbabwe						Turkey
						Venezuela

Agreeing to Iyer (2004), in 1995 the poorest twenty countries in the world are all ex-colonies. Based on Iyer research, colonization may influence economy growth. Therefore, there is a lot of pressure in developing countries to improve economy. Iyer(2004) also stressed on the influence of British colonization in India land tenure system. In addition, Almselati *et.al* (2011) highlights Malaysia urbanization process started as early as during colonization as the implication of British colonization in Malaysia. Like many colonization countries, settler colony like British gives implication towards land use and transportation system since they set up the basis structure of the colonized country. In many colonized countries, inheritance of knowledge and skills are adopted during the colonization. Most of the town planning is planned to the needs of the colony. In terms of land system, coalition between local land system and adopted colony land system causes conflict especially after the colony left. Even after

independence, lack of experienced in administering the country and financial problems, developing countries still hang on to mother colony. Developing countries mainly are dominated by British colony and Spain. Other colony includes France, Netherlands and the United States.

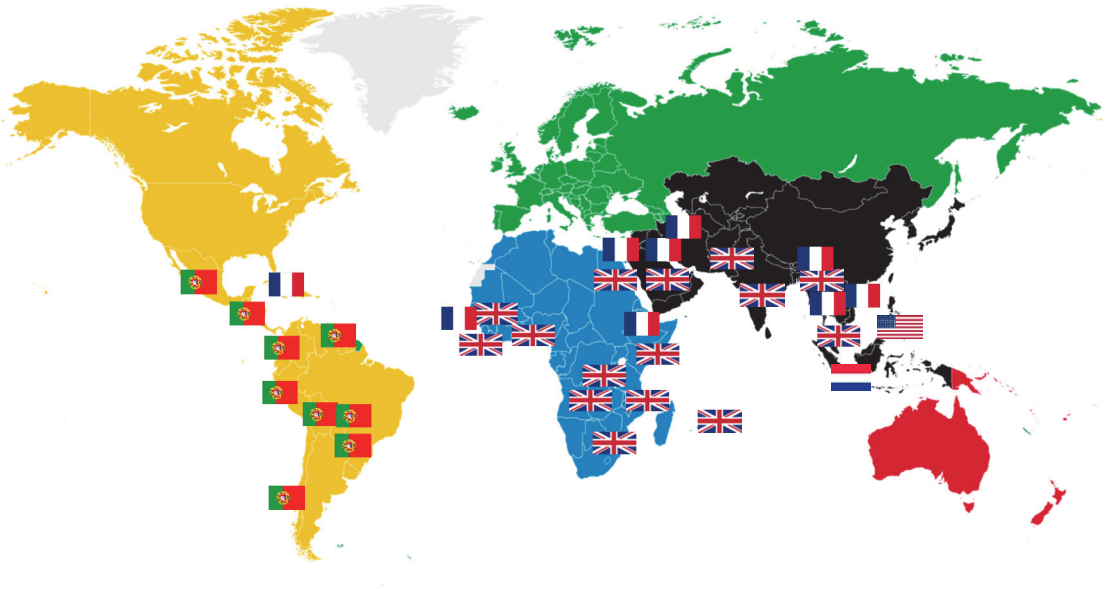


Figure 2.7: Domination of British colony in many developing countries

Source: Google Image

2.3.1 British Colonized Countries

There are about 30 countries under British colonization including Malaysia, India, Singapore, Uganda, Zambia and Hong Kong. This research takes Malaysia (previously known as Malaya or Tanah Melayu) as the case study to understand British colonization influence. The economy growth in Malaysia is currently encouraging and this has stimulated many land developments in Malaysia. However, the rapid development along with population growth has created many land use transportation issues. Traffic congestion is one example of transportation problems in Malaysia. The

congestion is contributed by the rise of private vehicles in Malaysia due to many reasons and one of it is the affordability of owning a private vehicle (Shariff, 2012).

Just like rubbing salt to the wounds, the lack of public transportations facilities and parking spaces worsen the condition of transportation system in Malaysia (Almselati *et.al*, 2011). Malaysia land use and transportation system can be trace to its policy. According to Barter (2000), the car-oriented planning cause more problems to the traffic in Malaysia. Kasipillai and Chan (2008), stated Malaysia has a high percentage of private vehicles usage and the current transport policy does not solve the problems. During British colonization, British urban planning style was fully applied by the British. Until today, although town planning system in Malaysia has transformed, British urban planning and architecture style can still be found.

According to Jamil (2006), the ethnic segregation is the key element to understand Malaysia economic, politic and social patterns. The effect of British colonization in land use and transportation planning can also be seen in the first town planning act in 1923 known as the Town Planning Enactment for the Federated Malay States of Malaya. According to Ainul (2012), the enactment of this law was to tackle the issue of sanitation and health. During the early years of town planning, land issues are very weak and there are no specific elements of planning control. The British colonization was the initiator of modern town planning system in Malaysia. Almselati *et.al* (2011) also agrees that the urbanization process in Malaysia is started by colonialism. Time is crucial for developing country especially for colonized developing country to establish land use and transportation planning.

2.4 Summary

In summary, developing countries in character are not similar to each other although in common most developing countries gives greater scale in economy growth. Despite struggle to improve in economy, land use and transportation problems are still varies according to each country background. Each developing country is different in history, culture, religion, population including colonization history. Although this theory seems shallow, it cannot be denied that the background of a country shapes country development. In proving this theory, analyses are explained in the next chapters to compare developing country land use and transportation problems between colonized developing countries and non-colonized developing countries. Analyses are also prepared to compare different developing countries independence period to understand the influence to type of land use and transportation problems face.

CHAPTER THREE
OVERVIEW OF JAPAN CITY PLANNING

3.0 Japan Strategies in Land use and Transportation Planning

As a develop country, Japan has went through all the process of urbanization and confronting problems in land use and transportation. Although in a different economy condition, planning history, law, skills and planning methodology, it is important to understand develop country strategy in land use and transportation planning. Especially on how develop country like Japan balance between the needs of land use and transportation. This chapter is a review of Japan strategy towards its land use and transportation planning focusing in the goal of balance between land use and transport through safe city and compact city. By 2050, more than 50% of the world population will lived in urban areas. Chart 3.1 shows Japan population comparison in 52 years.

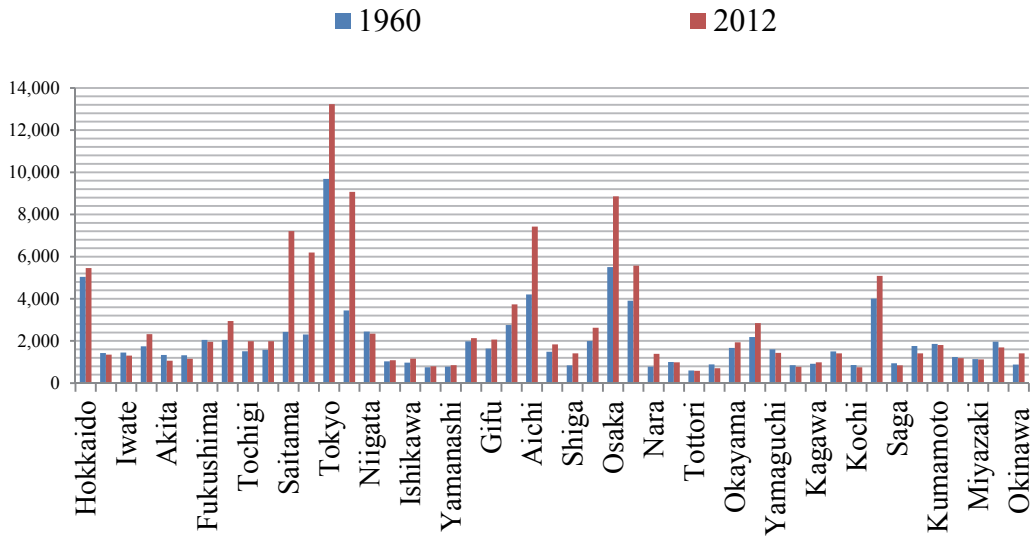


Chart 3.1 : Japan population comparison between 1960 and 2012

Source: Japan Statistical Bureau

The aging population and the declining birth rate are main concern in planning any city. Despite of the concern in its population, Japan is very well-known with efficient transportation system. Japan development and urbanization is rapid and the transportation system was undoubtedly among the best in the world. At the same time, Japan also has constantly preparing for natural disaster such as earthquake and tsunami through technology, engineering and sustainable city planning. Over the years, many preparations were made to face the earthquake and tsunami. This is a mitigation effort towards reducing the number of casualties and destructions of cities.

As a comparison, the population of Japan between 1960 and 2012 showing decrease percentage at certain prefecture. Based on the data provided by the Japan Statistical Bureau, the several prefectures such as Tottori, Shimane, Tokushima, Nagasaki and Oita are showing a slight decrease of population but not in big cities like Tokyo, Osaka, Fukuoka and Saitama. In spite of the earthquake tragedy, Japan is facing another predicament in its population. 25% of Japan total population is estimated to decrease by 2050. It is estimated, 27% of the population will be aged 75 and over. In addition, the child population between the ages of 0 to 14 years old is only 13.1% in 2011. It is projected that in 2050, there are only 9.7% child population at the age of 0 to 14 years old will be recorded in Japan. The imbalance demography between the aging society and the child birth rate is unquestionably worrying. In fact, from the urban planning aspect, planning should be in view of the demography of Japan for the next decade. In 2005, about 44.9% of people in Japan concentrated at the major urban areas that are Tokyo, Nagoya and Osaka. This means, nearly half of the population are urban people. Therefore, more facilities and development planning should fit the aging society and also urban areas. In addition, municipalities focus to a concept that enables efficient

public transportation in one place as the increase of density in the city area like compact city.

The earthquake that took place in 11th March 2011 at 130 km east south of Ojika Peninsula of Tohoku is one of the great earthquakes ever recorded in Japan. The earthquake has result a huge 40 meters of tsunami waves and it first hit the land of Miyako-shi in Iwate prefecture. The powerful tsunami not only kills many living souls but also destroyed many homes and cities. It is recorded that about 398 thousand buildings are damaged due to the earthquake and tsunami. This also means, many cities and residential areas are destroyed massively. The devastated incident gives many expertise in the field of engineering, architecture, urban planning and transportation in ponders to provide a safer town. Apparently, earthquake and Tsunami can be predict but cannot be avoided. Now, the jeopardy for expertise is to provide safe city and accepted the fact that the same tragedy can occur any time.

3.1 Safe City Planning

Safe city defines a lot different meaning to a different purpose in other countries. Safe city reemphasizes the idea of security and self-containment. In many safe city ideas describes the safety system to prevent and reducing crime as well as from vehicles massively encroaching residential areas. Safe city resembles the feeling of peace and alertness to the condition of the neighbourhood. The famous book of “The Death and Life of Great American Cities” written by Jane Jacobs in the 60’s, alerted many professionals towards the idea of safe in a city. However, in areas where natural disaster often occurred like earthquake and tsunami, a different notion of safety is portrayed. Safe city is not anymore about crime or feeling secured. A safe city means a city that

eases individuals to escape to safer habitation and protect them when disaster occurs. A safe city means, infrastructure like roads and houses are planned and designed to lead people to nonthreatening areas. In disaster prone areas, safe city means towns planned to support evacuation quickly including to be harmless and feeling safe in own neighbourhood when disaster occurs.

Figure 3.1: Tsunami after effect that occurs in 11th March 2011

The government of Japan has taken many precautions and measures in confronting earthquake and tsunamis in providing safe city. After the Great Hanshin Awaji earthquake in 1995 for example, Earthquake Disaster Management Special Measures Act was endorsed. In accordance, damaged reduction measures towards transportation and urban planning are applied when such disaster occurs. In certain parts of the Japanese Urban Planning Law, the countermeasures for earthquakes were amended and buildings must undergo strict earthquake inspection. Therefore, we can relatively say that Japan has continuously refining measures to face earthquake and tsunami through time. In fact, the most of the effected cities for decades are revitalized and planned in a condition that supports evacuation if disaster reoccurred again. Roads

are design leading people to higher ground. High walls are built near sea area and tsunami prone areas to protect the city. Alarm were announced whenever big earthquake strike. Even, mobile phones are equipped with earthquake alarm system to alert people.

There are several categories in the Japan land use system. The first is category 1 that is exclusively low rise residential zone followed by category 2 that is exclusively low rise residential zone. There is also category 1 and 2 for mid/high rise oriented residential zone. Residential zone are also divided into several other zone that is category 1, 2 and quasi. In addition, there is also neighbourhood commercial zone and commercial zone. Lastly are the industrial zone that is divided into 3 zone that are industrial, quasi and exclusively. All of these categories are differentiate by the colour coding of each land uses. In addition, the requirement of building control must also follow the floor area ration (FAR). The floor area ratios determine the category of land use zones permitted in the area. It also indicates the maximum floor area ratio from 50% to 200% and also the maximum building coverage ratios from 30% to 60%. The floor area ratio used in Japan is based on the total floor area of the building divided by the site area. In addition, the building coverage ratio is also used based on the building area divided by the site area of the building as shown in Figure 3.2.

$$\text{FAR (\%)} = \frac{\text{Total floor area (B+C)}}{\text{Site Area (A)}} \times 100$$

$$\text{BCR (\%)} = \frac{\text{Building area (B)}}{\text{Site Area (A)}} \times 100$$

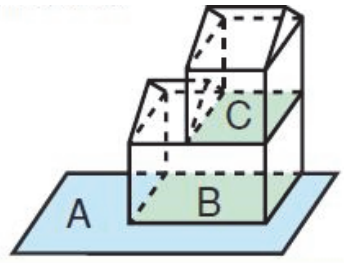


Figure 3.2: The floor area ratio and the building coverage ration common used in Japan planning

Source: Ministry of Land, Infrastructure and Transportation Japan

In Japan, mix development is encouraged however the type of building located in the area must followed the specification indicated in the regulations. The restrictions are focused into slant plan, floor area ratio and also the shadow restriction of the building. Given the authority of the municipality, certain building may be exempted from the rules based on the approval of the authority. For example, houses are not permitted to be developing in the exclusively industrial zone however it is not strictly prohibited. Unlike restaurants with floor space of 150m^2 the regulation of the Building Standard Law prohibited its development at the exclusively industrial zone ultimately.

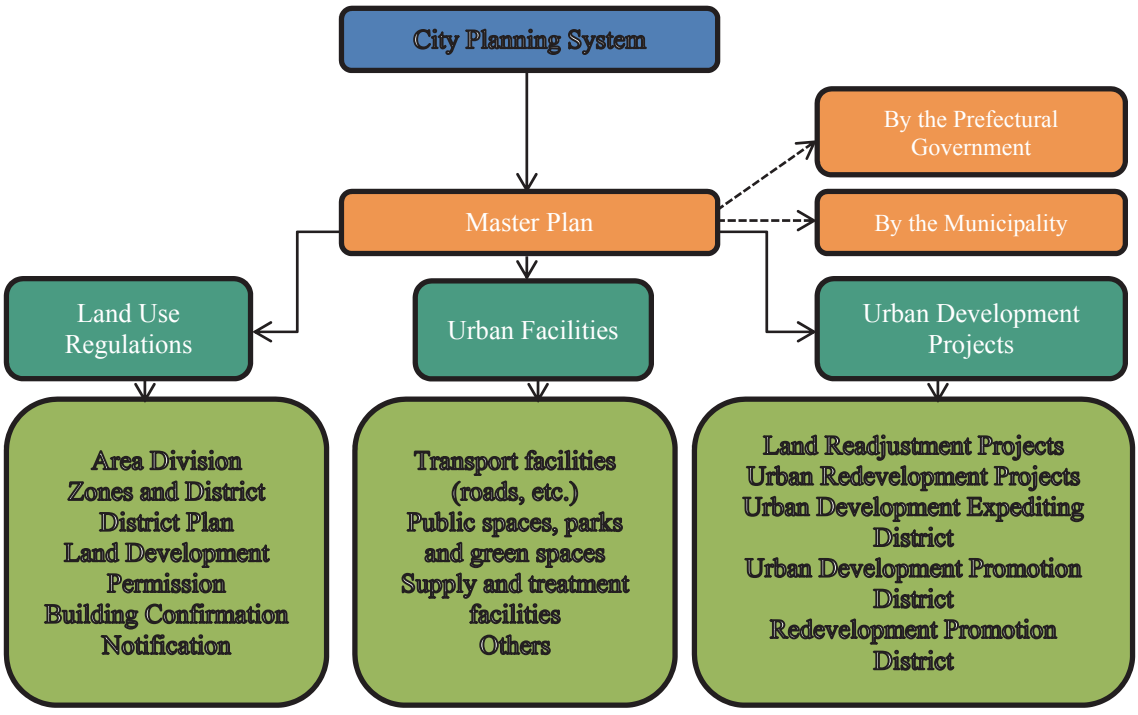


Chart 3.2: Structure of City Planning System in Japan

Source: Ministry of Land, Infrastructure and Transportation Japan

The municipality or the prefecture government are responsible to plan over the Municipal Master Plan. Any land development including building confirmation, notification, urban facilities and any development project will need to apply under the prefecture city planning. In addition, the land use regulations include area division, zoning and district zoning. Building height control and also land utilization of urban land also falls under the land use regulations. Furthermore, transport facilities and also infrastructure falls under the urban facilities. Land readjustments in Japan are very popular demanding restructuring and planning of city lands. This process falls under the urban development projects.

The land use regulation of Japan also includes the area division system. The area division concept is important defining the area that can be develop and cannot be develop. The Urban Promotion Area or UPA and the Urbanization Control Area of UCA fall under the area division system. The urban promotion areas are the centre of urban area where development is most promoted. While, the Urbanization Control Area or UCA are areas where agriculture land is most situated thus not allowing massive development. Moreover, there are also district plan that is used for planning of public facilities, building control and regulations and also planning over green areas.

Utsunomiya city is located in the Tochigi Prefecture. Like other cities in Japan, Utsunomiya city also apply the Japanese land and transport system. The land use pattern as shown in Figure 3.3 includes several categories of residential zone, neighbourhood commercial zone, quasi-industrial zone and others. The urbanization promotion area or UPA are concentrated in the urban centre of Utsunomiya. In the Utsunomiya city land use zone map, it is indicated the boundary of UPA and UCA. Such planning is to avoid

urban sprawl and as a method of planning control. Roads and railways are used connecting other cities in the north and south of Japan.

According to Jinnouchi (), Utsunomiya city is facing population decrease and aging. Therefore, Utsunomiya city takes a lot of revitalization measures to improve the revival of its city through promotion of in town living especially in city centres. This is a result of massive sprawl occurs in Utsunomiya when development attracts people from the city centre. In future, the development of light railway transit in Utsunomiya will increase the percentage of Utsunomiya city attractiveness and revive the city centre.

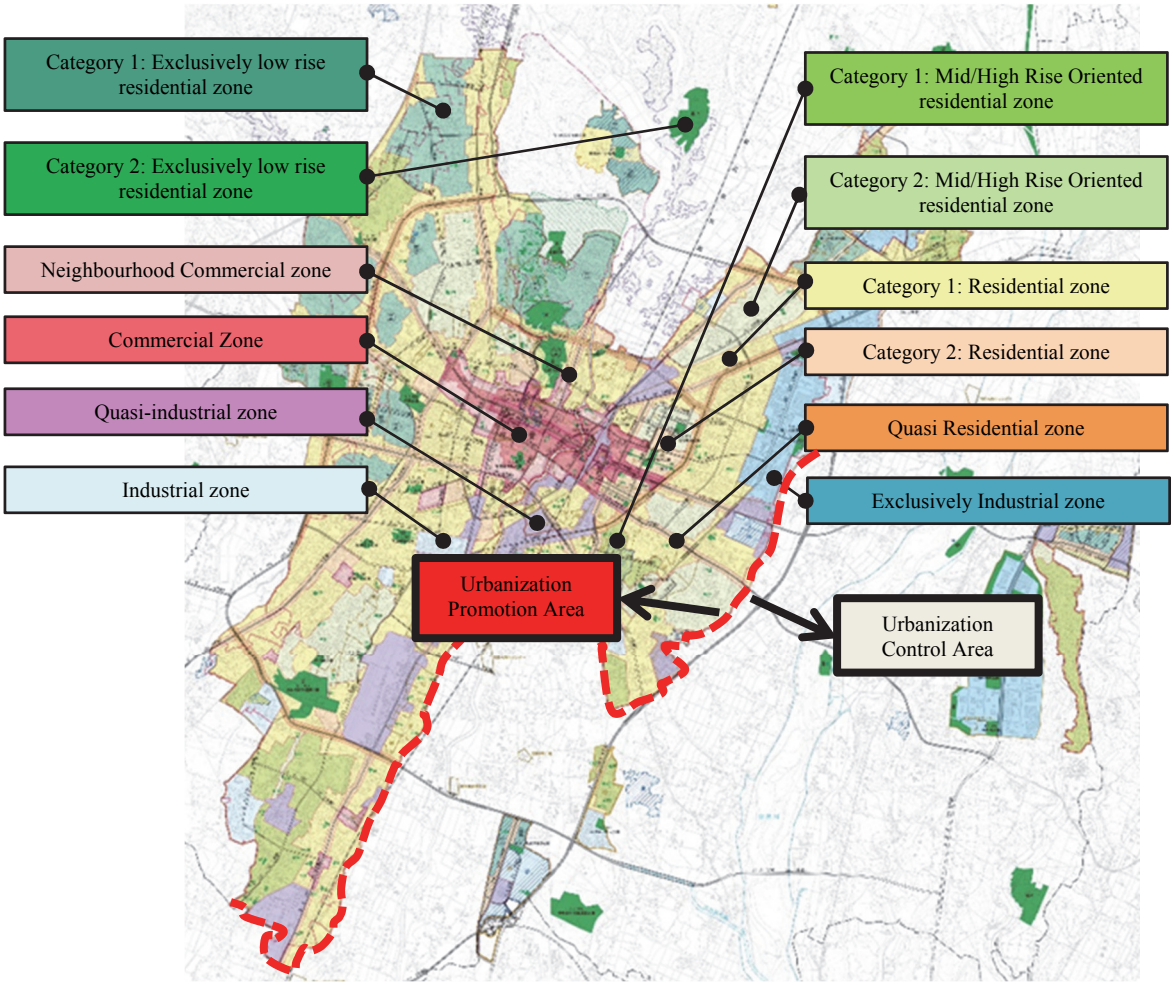


Figure 3.3: Utsunomiya City Land use zone

Source: Utsunomiya City planning website

3.2 The Compact Cities Goal

The main purpose of compact city in Japan is to overcome the issues of falling population. In curbing this issue in many Japan municipalities are proposing for the compact city goal. The compact city promotes a sustainable city development that encourages the use of public transportation as well as covering the aspects of environment. It allows concentration of people in one place and contributes to the integration of land use and transport. This means, lower cost will be incurred by the municipalities and more people can enjoy the benefits. Moreover, compact cities also promote the environmental issues by decreasing the usage of private vehicles as well as the effective use of cities rather than expanding more developing lands. In favour compact city cut travelling time, promotes walking and bicycling and reduce the amount of activity outside the city boundary. Hence, in an aging society country like Japan, it can take all benefit from the compact city idea. Develop country are concern most in social hazard. However, the occurrence of earthquake and other natural disaster has alerted concern of the Japanese government towards natural hazards.

The compact city design has its drawn back. Controlling development into a control scale or boundary is hard to implement. This is because; the pressure of land development, politics and also the wide use of vehicle promotes more arable land to developing. In addition, flat surface land with good geography stimulates urban sprawl. Though, in Japan compact city is highly mentioned and urged by the municipalities. We can reduce the percentage of declined cities by discouraging new development outside the urbanization promoting area. In another word, as an alternative of expanding outwards and using more arable lands, cities can be efficiently utilized and thus more cities can revitalized. Now; do municipalities near the affected earthquake areas will

still continue to set for “compact city” goal after the Great East Japan earthquake? More people looking forward for safer cities that can give assurance to them.

The main problem as result of the Great East Japan earthquake is the destruction and paralyzed of the town function. It can be seen at street as connector, transport as method of movement as well as other basic needs like water, electricity and food supply. In some severe towns, community are totally left with nothing what more other facilities like hospital. Therefore, the operative actions taken by the government to assist the victims to shelter, medical, food and relocating them to safer grounds. On top of that, the government particularly the municipality needs to come up with reconstruction strategy to redevelop the town again after the Great East Japan earthquake. This is to retain the normal life as soon as possible and to rebuild the town in spite of the tragedy that happens to them.

One of the key actions conducted by the government is to apply the people centric approach. The concept is to place people safety on top of all priority. These are done by getting close to the people and acquire their needs after the earthquake. The approach by engaging with the victims and listening to their views and thoughts are significance of the post-earthquake incident. This will provide links to the local community as well as to get the municipalities aware to the needs of the people in the approach of people centric. These strategies are reported in the “Towards Reconstruction: Hope beyond the Disaster Report” to the Reconstruction Design Council in response to the Great East Japan Earthquake (2011). According more to the report, the reconstruction projects will be assessed based on planning stages. Among other consideration will also concern the aging society which is the upmost concern issue highlighted in Japan. In addition, environment, public transportation, energy

conservation and safety will be considered in the development plan. In short, we can say that compact city goal is relatively the same after the incident however, prior to reach compact city goal is to consider natural hazards like tsunami and earthquake risk through consideration of safer city and prioritizing the people.

3.3 Balancing Social and Natural Hazard

After economy stability, the attention of develop country are given towards environmental and social development. It is important for Japan to plan town facing the aging society and decline population to sustain town development. In addition, Japan is now facing bigger task to plan over a sustainable town safe from natural hazards such as tsunami and the earthquake. It is indeed a big task to plan over town balancing the social and natural hazard. The risk in social aspect especially in Japan is seen obviously in the population issues. The important part in facing the social hazard is the impact of the hazard itself. Population decline in Japan will give severe impact to Japan development. This is because the declined population will affect the labour and employment sector. The high percentage of aging society will be a problem to Japan development and it is seen as social risk to the country. According to Yashiro (1997), the reasons for aging society are fertility trends and life expectancy. It is also contributed by the increase of women in the labour force as well as increase in unmarried women. According to the National Institute of Population and Social Security Research of Japan, the cost of social security in Japan has increase since 1970 to 2008. This is because of the aging society particularly spending for the medical insurance and pensions. The government spends about 49, 544.3 billion yen funding retirement pension in the year 2008.

In addition, natural disasters that frequently occurred in Japan also become a threat to the country. The natural hazard concern is to the risk of environment impact. Hence, natural hazard in Japan relates to the impacts of tsunami and earthquake giving a lot of risk towards people life. There are several types of natural hazard impact such as earthquake, volcanoes, landslides, flooding, tsunamis and hurricanes. The natural risks are unavoidable and although technology offers many organized situation, it is often give risk to human. The cause of tsunami for example although are predictable and manageable but still at risk. Therefore, Japan is concern towards planning for town that are safe from threat of the natural hazards but at the same time giving people better life condition in the town. Therefore, it is a heavy work for Japan government to plan over sustainable town for social hazards problems such as decentralizing town and aging society. Japan also needs to plan over city that is safe from natural hazards like tsunami and earthquake.

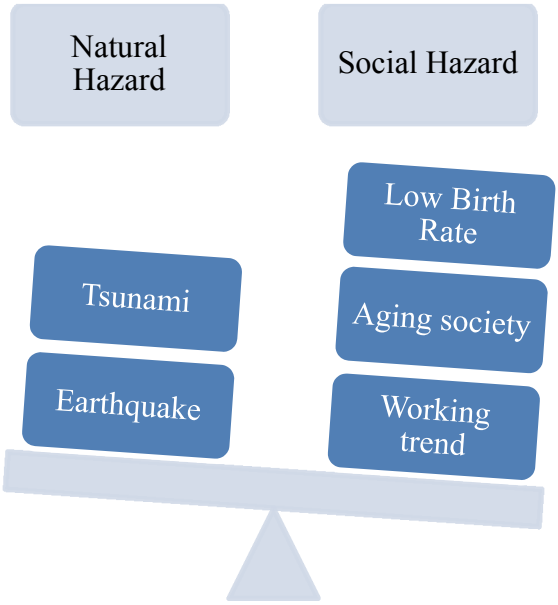


Figure 3.4: Balancing Social and Natural Hazard in planning sustainable town in Japan

3.4 Comparison Strategies before and after the Great Earthquake

In understanding the important of planning for natural hazard town, we compare the strategies before and after the Great Earthquake occur in 2011. The damage in the Great East Japan earthquake in 2011 was largely occurred at the coastal municipalities of three prefectures of Iwate, Miyagi and Fukushima Prefecture. Therefore, this study will cover these three prefectures. In another hand, the other severe devastated area of Namie-machi in Fukushima Prefecture, Futaba-machi, Okuma-machi, Tomioka-machi, Naraha town, the six municipalities of the city within a 30km radius from Hirono entering the Fukushima Daiichi nuclear power plant will be excluded from this study. The total study area accumulated a total of 29 municipalities that is 10 municipalities in Iwate Prefecture, 15 municipalities in Miyagi Prefecture and 4 municipalities in Fukushima Prefecture. In this study, we evaluated how municipalities carry out the plans in the purpose of the development. Does it different before and after the earthquake disaster?

The methodology to conduct the study is to analyze the purpose and direction of reconstruction plan based on the municipality master plan before and after the Great East Japan earthquake. The main reason analysis are made is to understand the differences in the municipalities master plan objective and its situation. What and how the tragedy that took place in March, 2011 does imply onto the objective of the municipality master plan. This will inform to us the direction of that master plan and the situation that the municipalities need to overcome. The issue of depopulation has influenced many municipalities towards achieving compact city. Therefore, it is expected that many municipalities within the disaster area as well obligate to compact city objective in their master plan. The first group in the case study within the three

prefectures is municipality that specified the compact city objective in their master plan. The second group is municipality that did not specified the compact city as objective in their master plan. There are also third groups that are not matured and eligible yet to make the master plan.

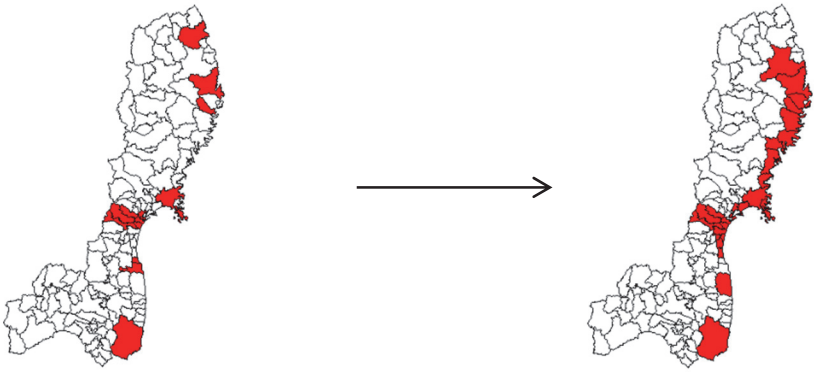


Figure 3.5: On the left are municipalities that aim for compact cities before earthquake while on the right side are municipalities that aims for compact cities after the earthquake

Table 3.1: List of municipalities with compact city objective in the study area

After Earth quake / Before Earthquake	**Municipality with compact city objective**	**Municipality with no compact city objective**
Municipality with compact city objective	1 Miyako-shi, Otsuchi-machi, Ishinomaki-shi, Sendai-shi, Iwaki-shi	2 Kuji-shi, Rifu-machi, Tagaki-shi, Shinchi-machi, Soma-shi
Municipality with no compact city objective	3 Iwaizumi-machi, Yamada-machi,Kamaishi-shi, Ofunato-shi, Rikuzentakata-shi, Kesennuma-shi, Minamisanriku-cho, Higashimatsushima-shi, Matsushima-machi, Watari-machi, Yamamoto-machi, Minamisoma-shi	4 Noda-mura
Unannounced Municipality with Master Plan	Onagawa-cho, Shiokawa-shi, Shichigahama-cho, Natori-shi, Iwanuma-shi	Tanohata-mura

Table 3.1 explains the list of municipality with compact city objective before and after the Great East Japan earthquake. From the table, we recognize that there are 4 groups in the study area. In group 1 and 2 are municipality with compact city objective in their master plan before the earthquake while in group 3 and 4 are municipality with no compact city objective before the earthquake. While, after the earthquake in 2011, group 1 and 3 are municipalities with compact city objective in their master plan before the earthquake while group 2 and 4 are municipality with no compact city objective before the earthquake. The result of both analyses before and after the Great East Japan earthquake towards municipalities' master plan objective is explained in table.

Table 3.2: The factors influenced on objective before and after the great east japan earthquake

Before Great East Japan Earthquake	**Municipalities with compact city objective**	**Municipalities with no compact city objective**	**Result of t-value (average verification)**
Population Increase Ratio in 2005 to 2010 (%/Year)	-0.39	-1.13	2.54*
Density in habitable area (Person/km^2)	1360	519	2.23*
After Great East Japan Earthquake	Municipality with compact city objective	Municipality with no compact city objective	Result of t-value (average verification)
Death/Missing Rate (%)	2.41	0.66	2.78*
Death/Missing person (Person/city)	785	126	3.61**

* Significant level: 5% ** significant level: 1 %

In Table 3.2, the population increase ratios in municipalities with compact city objective are negatively lower than municipalities with no compact city objective before the Great East Japan earthquake. This indicates that compact city has lower degradation

percentage if we compare with compact city without compact city objective. The strategy to overcome social hazards like depopulation can be done through the application of compact city objective. In addition, after the earthquake in 2011, death rate is studied. The death rates are higher in municipality with compact city objective if we compare with no compact city objective. Hence, now natural hazards are also vital to be considered as compact city as it also gives threat. Future strategy should balance between the needs of mitigating social hazards and also natural hazards in these areas. Before the earthquake strikes in 2011, most of the municipality aims for compact city to face social hazards especially in population. Compact city before the Great East Japan earthquake allows effective sustainable and integrated land use and transport system in the city.

3.5 Comparison Using Text Mining Analysis

Based on the municipalities' master plan and Reconstruction Plan, we analyze by extracting sentences that match the criteria. The item that is analyzed is to know the relevance and purpose of the compact city before and after the earthquake. Then, analysis is performed in order to know whether there is a difference and change of land use policy in the municipality. Next, the word "aggregate" and "compact" and target the text to analyze the relevance of compact city before and after earthquake. The word "intensive" and "compact" are targeted. KHcoder is free software for text mining and also content analysis. It is formulated in order to analyze various data obtained. KHcoder also is compatible with language, multiple environments and it can also perform data analysis in any other language. An analysis using the co-occurrence network by KHcoder examines the connection between words. In order to avoid error,

unknown words is excluded, proper names, organization name, person's name, place name, exclamation, adjectives, adverbs, and analyzed and uses the word noun in the analysis.

3.6 Analysis Results By Text Mining Analysis

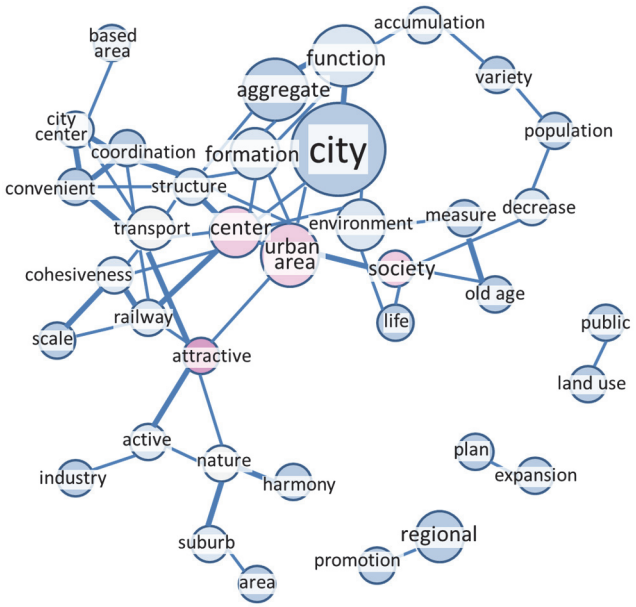


Figure 3.6: Analysis of the municipalities' objective *before* the great east japan earthquake

As in Figure 3.6 it is observe the result of the text mining analysis in the strategy taken by the municipality before the Great East Japan Earthquake. Before the Great East Earthquake, there are association between aggregation of city function, convenience of transportation, and the combination of attractive place and urban area in the municipality master plan objective. In general the strategies taken before the Earthquake are focusing into towards achieving compact city due to the depopulation issue in Japan. In Figure 3.7 words such as safety, relocation to upland, recovery and improvement of existing facilities function can be seen after the earthquake. After the earthquake, the purpose of the master plan has been weakened as to activate the central city in order to

improve the traffic environment. This implies the strategy to ease the people evacuation to higher ground during disaster.

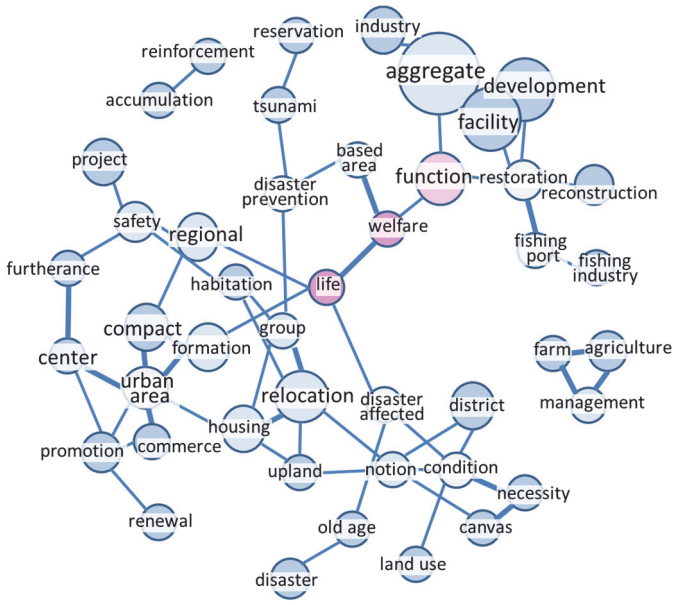


Figure 3.7: Analysis of the municipalities' objective *after* the great east japan earthquake

It has become priority of the municipality to curb problems related to traffic in the city that hinders and delay the evacuation process during emergency. The new objectives are creating a safer town and ease the people to a safer place when disaster occurs again. In recreating a safer town, people will be relocated at a higher ground along with traffic layout that eases the movement of people to the higher ground. Thus, affirms to us that before the Great East Japan earthquake, many municipalities are focusing into developing compact city and increasing density in the town. On the other hand, after the earthquake, a significant difference can be found in the analysis. Drastic changes towards compact city are absolutely important as the numbers of population are also drastically reduced due to the death and missing rate after the Great East Japan

Earthquake. Therefore, in promoting a safer city and achieving compact city objective, there is a need to perform a combination of both in a dynamic strategy.

One of the strategies is to apply the cluster compact city along with the development of one small compact city. The connection of compact city proposal will allow networking among small compact city through transportation modes. Therefore, integration between land use and transportation are applying in such strategy. In the focus of creating a safer city, small compact city can focus to be relocating at higher ground areas as well as integrating many transportation modes such as walking, bicycle and public transportation. These will create a hierarchical traffic system that create a gradual pyramidal structure and proved an access function.

3.7 Reconstruction plan in Yamada

Yamada town is located on Sanriku seacoast in Iwate prefecture, and had about 18,000 of population before Great East Japan Earthquake. The town was severely damaged by tsunami and as a result 604 persons were killed and the missing persons amounted to 149 persons. The reconstruction vision in Yamada was announced on July 1st 2011, and reconstruction plan was enacted on December 2011. The basic philosophy is “Never victims caused by tsunami”, and aim to create the compact city based on existing settlement. The transportation system is based on the ladder network considering redundancy in traffic function. Moreover, the construction of sufficiently wide escape routes for evacuees connecting high ground with lower areas can help ensure smoother evacuations and improve resilience after the disaster. According to this concept, the reconstruction of road network was proposed in reconstruction plan, one of which is seen in the Yamada Town Reconstruction Vision (see Figure 3.8 and Figure 3.9).

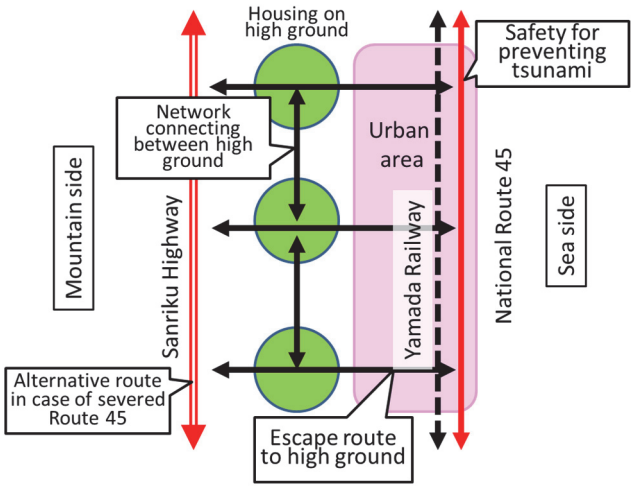


Figure 3.8: Reconstruction vision of transport in Yamada

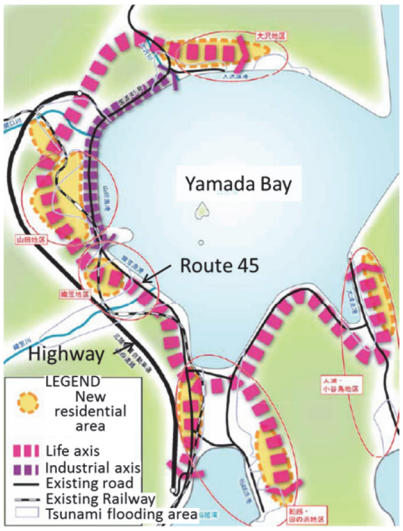


Figure 3.9: Reconstruction image in Yamada town

The speedy recovery of disaster areas can be achieved by combining the effective use of lowlands that suffered from the tsunami with safe high ground for residences. There is indeed a need to relocate victims in the afflicted area to safer place to live. Particularly, safer areas to develop as new habitats are towards higher grounds avoiding coastal areas. The compact city objectives of reconstruction plan are vital as caused of natural hazards necessities in creating safer place to live. However, the

depopulation of Japan also urged the construction of compact city. Thus, newer towns that will be developed should aim towards compact city objective in solving the social hazards needs in Japan. For our next challenge, step by step strategy needs to take into consideration by the government so both social hazard and natural hazard of Japan can be solved.

3.8 Integration Efforts In Japan

Integration of transportation systems in Japan consist of private vehicle, public transportation and non-automobile transport mode such as bicycle. The integration is a success especially in big cities such as Tokyo and Osaka where public transportation are efficient. The variable alternatives of transport mode allow people to choose based on travel necessities. For example, people living nearby working place in Tokyo city will choose to use bicycle compared to cars as it is convenient to use bicycle. In addition, people can rent or drive own cars when going to further distance in different districts. Walking in Tokyo is also common for most people as parking and owning cars are expensive. The application of many alternatives including efficient public transport allows people in Japan to decide based on their travel needs. Therefore, it is important for developing countries to integrate transportation system based on land use condition and travel needs as to reduce dependability towards private vehicles. This is also important to curb the increase number of cars on the road as to avoid many land use and transportation problems related. Besides efficient rail transportation system, Japan is also famous with the usage of bicycle in many parts of their country.

In addition, the usage of bicycle in many Europe countries like German is also encouraging in the recent years due to the cautions of environmental, economy and also convenient. Based on the study made by Koike et.al (2000), the usage of bicycle depends on the people attitude toward bicycle. In comparison between develop and developing country, Yamamoto (2009) finds there is different pattern of bicycle usage between Osaka and Kuala Lumpur. In the research, bicycle usage in Osaka is influence by the effective rail networking as well as high density area while in Kuala Lumpur, bicycle usage are higher in lower density areas due to different characteristic of bicycle usage. This is a good result of integration between public transport and bicycle. There are several characteristic appear in the Japanese society that encourages the high percentage of bicycle usage in Japan that is:

a. The cost of owning a bicycle is inexpensive
b. The conveniently of using bicycle in their daily life
c. Location of railway stations allows cycling at most advantage as mode of transport.
d. The attitude and upbringing of a person.

Despite of the effectiveness using bicycle as mode of transportation, the application of the bicycle usage needs a lot of willpower. This is because, the transition of using motorized vehicle to bicycle is challenging if there is no comprehensive plans devoted to promote bicycle as alternative transport mode. For example, lack of bicycle lanes, parking, poor transport policies and accidents will degrade the efforts to use bicycle. Research by Koike et. al (2001) suggest that factors influence the use of bicycle

are restricted mobility of using the bicycle as mode of transportation, habits, bicycle favouritism and financial constraints. In addition, the habits of the people are also vital in ensuring the usage of bicycle. In Japan, the percentage of bicycle usage is highest among people age 17 years and below. However, the trend are encouraging as people make use of bicycle for the purpose of healthy lifestyle and convenient. These important key points in integration efforts are the availability of transport option.The lack of option in travelling mode increase the percentage of using private vehicle used for daily commute. The use of non-automobile transport mode such as bicycle is a good stepping stone towards an integrated transport system. Considering different kind of land use pattern and travelling pattern, it is important to make integration between land use and transportation systems.

CHAPTER FOUR
VARIATION OF LAND USE AND TRANSPORTATION PROBLEMS IN DEVELOPING COUNTRIES

4.0 Situation of Developing Countries

It is important to study the development of land use and transportation in developing countries as the number of developing countries encompasses more than 50% of countries in the world. It is also said that developing countries population are more than 50% of the world population. Issues related to land use and transportation development such as urbanization, migration, squatters, environmental issue and congestions are some issues are often raised out in developing countries. This issue are practically related to the economy, human being development, living quality, social development and sustainable development. Commonly, these issues arises often in developing countries as focus is much given to improve economy development hence land use and transportation planning are taken lightly.

More development is constructed in urban areas as well as encroaching rural areas to improve economy. Politicians put aside important policies to improve urban living quality instead supporting more urbanization. In countries where cheap labour is widely found, developments are difficult to put a hold on. Problems also occur in developing countries because land use and transportation are often collided and difficult to balance due to the needs of each element. The big question is why land use and transportation problems occur in developing countries? The next question is what are the factors contribute to land use and transportation problems? Lastly is to understand

does all developing countries land use and transportation problems identical or is there any other reason dividing them?

The differences of land use and transportation problems in developing countries can occur. This is because, each of developing countries are different in history, culture, skills, education, economy, political and government which all will contribute to land use and transportation. According to McCoubrey (1988), the English Planning Model was widely used in developing countries. However, the wide differences of developing countries condition today, the model were seen as unsuitable for developing countries. Clearly, there is an influence of planning history towards current land use and transportation problems due to its inconformity. The aspect of colonization is a factor that can differentiate problems between developing countries.

The aspect of colonization is an important aspect in developing countries as colonization divides these countries having earlier or later independence. This means, these countries may have longer time to develop or shorter. In addition, colonization also possible to cause colonized countries to inherit or follows colonizer rules and administration style. Different condition before and after colonization may be the cause of problems in land use and transport due to suitability. Saying that, it is important to study whether colonization has given influences to the current land use and transportation problems? Hence, does land use and transportation problems that occur and persist in developing countries are cause by colonization factor? How does it vary between developing countries that was colonized and not colonized? Does these countries different from each other or does the factor identical?

Time and again, developing countries is measured into hierarchy based on economic status. The developments of economy however overgrow the essential needs of planning a suitable land use and transportation. As a result many urban illnesses occurred in developing country like increase usage of automobile causing traffic congestion, insufficient housing settlements causing squatters and imbalance economy distribution causing rural urban migration. However, the success of land use and transportation planning can be measured by balancing land use and transportation planning. In order to achieve balance, it is essential to plan for land use first hand and followed by transportation planning as tools to move from one land use to the other.

A sample of developing countries population must be select. The samples are obtained from a group of professionals in land use and transportation involving government representatives as well as private agencies attended a program held by Japan International Cooperation Agency (JICA). Using this platform, questionnaires are given out each year since 1999. The participant of the program each year is different therefore; this research is able to get a random sample for the questionnaires. Limitation however is restricted to participant of this program only. In order to avoid bias, none of the participant was selected and all participants are considered as respondent. The goal of the questionnaires is to investigate the problem of land use and transportation in developing countries from the professionals involves and experienced in land use and transportation field.

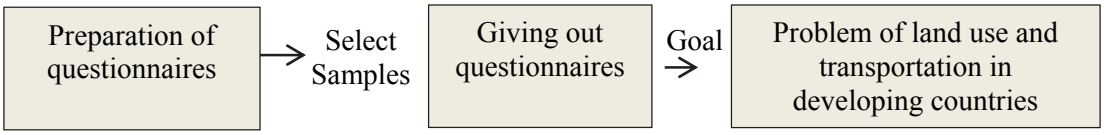


Figure 4.1: Method of collecting data for the research

4.1 Method of Data collection

Collection of data from all developing countries can be a tedious task. Therefore, data collection is conducted during Japan International Cooperation Agency (JICA) developing countries workshop held in Japan. It is the best platform to obtained original data about land use and transportation problems from various developing countries. The goal of the questionnaires is to identify the problem of land use and transportation from the view of the professional as they are the primarily people involved and understand the system related to land use and transportation. The professional is also the decision maker in their own country. However, the sampling could not be decided as there are limitations therefore non-probability sampling is used. Although, it may be arguable, bias of data is avoided as the respondents from developing countries are different each year and the origin of country is also different. Therefore, opinions and answers provided are generalized and do not favouritism to any specific country although may not include other kinds of professions. However, as the niche of this study is to understand the problems of land use and transportation in developing countries from the perspective of the professionals, the methods is considered novelty as the comparisons are made in between different years, different countries and different respondents. The types of data collected are both qualitative and quantitative data. Quantitative data analyses and results are explained in this chapter while the qualitative data is explained in the next chapter.

A quantitative formed of data allow controlled measurement of the data while a qualitative formed of data will allow more exploratory kind of data. This is to allow uncontrolled observation to the sample itself. Both of data give better, beneficial and quality information on land use and transportation problems in developing countries.

However, respondent number of years' experience involved in the field, job ranking, personal background, the number of sample, gender and also respondent age are not considered in selecting of sample. The selection of sample is directed to the participant in the JICA workshop. Nonetheless, it will not affect the data collected as the goal of the questionnaires is to identify the problems of land use and transportation in various developing countries. During data collection, convenient time is given to all respondents allowing them to think and answer the questionnaire carefully. In order to avoid bias, respondent of the same country are not allowed to discuss while answering the questionnaire. This includes questions obtained data for quantitative and qualitative.

4.2 Testing the hypothesis

The differences in land use and transportation planning in developing countries can be caused by culture, population and many others. For example, culture influences the housing industry in terms of design, layout and location. Difference can include the factor of colonization. The differences between land use and transportation problems in colonized and non-colonized developing countries are compared in this research. Firstly, from 150 developing countries that were listed by International Monetary Fund (IMF), 43 developing countries participated in the survey between 2003 until 2011. The number of sample for quantitative data obtained between 2003 and 2011 are 169 respondents. From the analysis, we able to obtain 10 factors suggesting factors contributed to failure of land use and transportation planning in developing countries.

The factors are:

a) Economy factor

b) Political factor

c) Law problem

d) Lack of cooperation between ministries

e) Lack of talent

f) Lack of public transportation

g) Lack of information

h) Difficulty of implementing the policy

i) Unconcern of people

j) Others

4.3 Result of Analysis

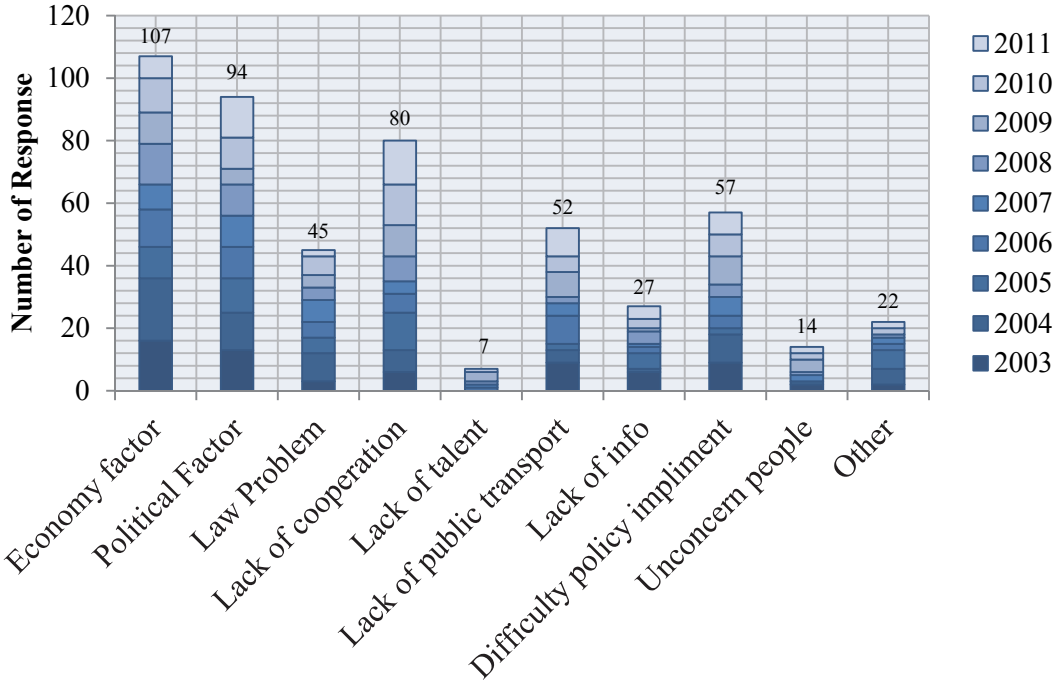


Chart 4.1: Feedback given by JICA participants from 2003-2011

Chart 4.1 shows the result of participant's response regarding factors that affected land use and transport planning in their countries. Political and economy factor score the highest in the chart. Other than economy and political factor; lack of cooperation, lack of public transportation and difficult policy implementation are other factor influences problems of land use and transportation in developing countries. In addition, respondent also mention about poor political will, misuse of power and politician interference in formulating policy in land use and transportation planning. Respondents from developing countries like Kenya, Mongolia, Cambodia and Jordan mention that their government do not have total power towards land as most lands are majorly owned by the people. The government also faces difficulty to plan accordingly as land acquisition is difficult to use for transport facilities improvement or public infrastructure and it has to go through time-consuming legislature procedure. In India, respondent mentioned some cases of land development take time as it has to go through judiciary procedure before government could actually take the land for transportation facilities.

Consequently, land ownership caused manipulation of land price initiating uncontrolled land development based on respondent answer. According to the participants, proper transportation facilities could not be implemented due to the lack of land ownership by the government. The changing of government results frequent change of policies. On the other hand, respondents from Jordan, Egypt, Brazil, Cambodia and Myanmar explain about economy factor restrictions in land use and transportation planning. The misuse of financial leads to poor unity of land uses and transport. Each of these factors obviously affects the success of land use and transportation planning in developing country. Clearly, economic factor is not the only factor affecting the success of land use and transportation planning in developing

countries. In addition, to assess the difference between colonized developing country and non-colonized developing country respondents answer, the data is separated based on the colonization factor. The benchmark determining the colonization period are based on colonization status after the World War 2. The end of World War 2 is used as timeline determining the respondent group as colonization period started declining.

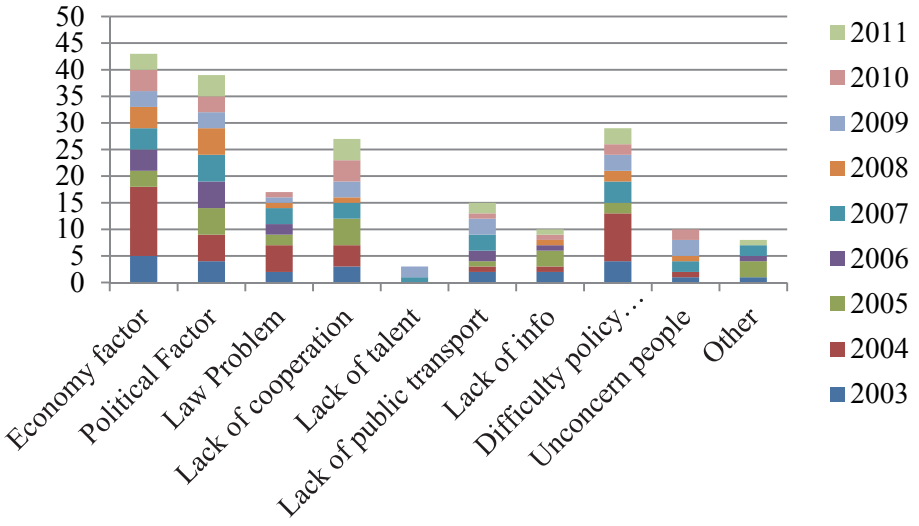


Chart 4.2: Non Colonized Developing Country Result

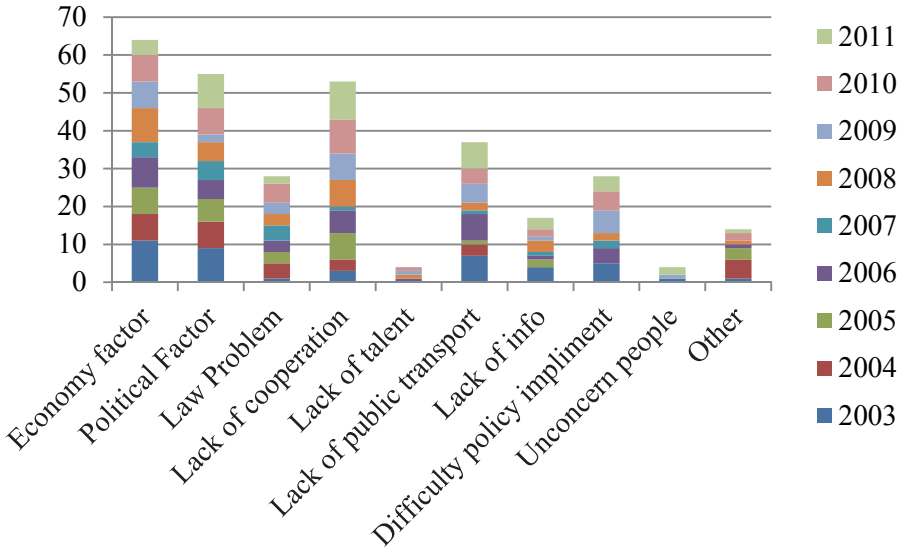
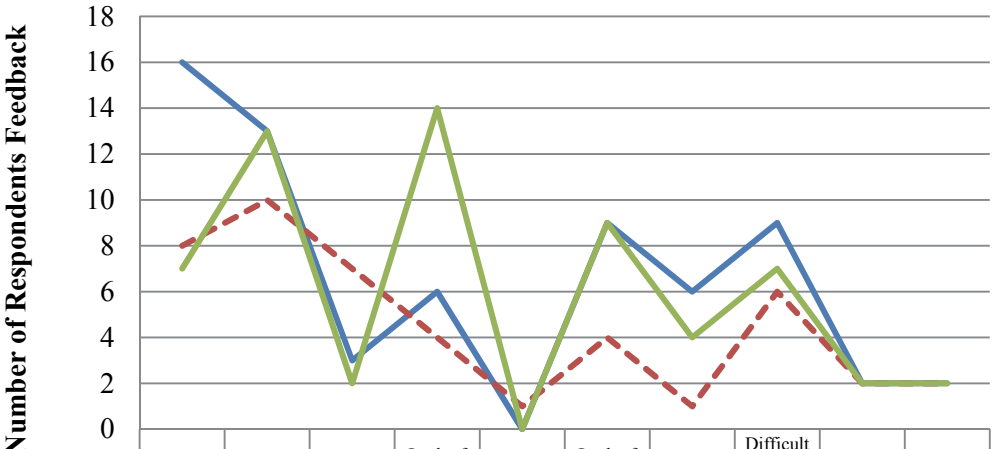


Chart 4.3: Colonized Developing Country Result

From the table, there are similar trend of answers between colonized and non-colonized developing countries respondent. Economy and political factor rank the highest in both tables. However, lack of cooperation and lack of public transport are slightly higher in colonized developing country respondent's answers. In contrast, difficulty policy implementation factor is seen higher in non-colonized developing country compared to colonized group. As initial analysis, there are differences between the two groups. Further analysis is needed to understand more about the respondent's data. As comparison the data are compared between three years to investigate the trend of respondents answer towards land use and transportation problems in developing countries as shown in Table 4.1.

Table 4.1: Comparison between colonized developing country and non-colonized developing country land use and transportation problems

Colonized Developing Country Land use and Transportation Problems	**Non-colonized Developing Country Land use and Transportation Problems**
Economy and political factor are main factor influence land use and transportation problems.	Economy and political factor are main factor influence land use and transportation problems.
Lack of cooperation is higher than lack of public transport problems.	Lack of cooperation and difficulty policy implementation are almost equally influence problems.
Lack of talent is less influential in land use and transport problems.	Lack of talent is less influential but there are influence of people in land use and transportation.



	Economy factor	Political Factor	Law Problem	Lack of cooperation	Lack of talent	Lack of public transport	Lack of info	Difficulty policy implimen t	Unconcern people	Other
2003	16	13	3	6	0	9	6	9	2	2
2007	8	10	7	4	1	4	1	6	2	2
2011	7	13	2	14	0	9	4	7	2	2

Chart 4.4: Comparison of respondent's feedback between three years to understand the pattern of respond towards land use and transportation problems in developing countries

In cumulative, chart 4.4 shows economy factor decrease since 2003. This resembles the economy factor influences towards land use and transportation problems is not a permanent factor as economy of developing countries gets better. In addition, political factor in land use and transportation problems retained between the three years. This explains the risk of political factor in land use and transportation problems is severe and it is an important factor in developing countries. Political issue in developing country is severe due to several reasons. One of the reasons is the unstable government and people belief to the government system. The unstable government create much political issue due to poor trust as well as unconfident of the people to the government administered. In addition, poor government is contributed by many other factors. Poor government also contributed to poor economy growth. In terms of land use and transportation problems, political factor is seen in planning and implementation stage.

Much political interference affected planning and implementation therefore political factor influences many problems in land use and transportation in developing countries.

In addition, the number of lack of cooperation increases from 6 to 14 responds between the three years. The increase shows that the factor has become more important although economy factor decrease. Even though, economy has improved, lack of cooperation between departments for example between cities planning and transportation department shaped many problems. The poor integration between land use and transportation is a result of lack of cooperation. In addition, the poor integration can be rooted from the poor planning system and also the poor of law in developing countries.

4.4 Application of the Factor Analysis

XLSTAT is software develop by Addins software company that allows users to use statistical and multivariate analysis by add in application in Microsoft Excel. The easy friendly interface allows users to use this application by just add in the existing Excel application. Among statistical application by XLSTAT used in this research are the mean, standard deviation, correlation, ranking and multivariate analysis such as Factor Analysis. The 10 observed variables that are the 10 main factors influence land use and transportation problems are first correlated to produce the correlation matrix. The correlation matrix is the matrix of correlation that presents the relationship between variables. The value of -1.000 present negative relationships while +1.000 presents a positive relationship between the two variables. The Spearman correlation method is used based on the ranking. It is best to use the Spearman method because the research data are based on the yearly respondent's data. Therefore, the nature of the data is more

suitable to be translated as ordinal data. In the table are the correlation matrixes of all respondents from developing countries towards land use and transportation problems.

Variables	Economy	Political	Law Problem	Lack of cooperation	Lack of talent	Lack of public transport	Lack of info	Difficulty policy implement	Unconcern people	Other
Economy factor	**1**	0.158	0.219	-0.378	-0.179	-0.082	0.085	0.275	-0.340	0.110
Political Factor	0.158	**1**	-0.282	0.114	-0.958	0.242	0.572	0.188	-0.166	0.584
Law Problem	0.219	-0.282	**1**	-0.342	0.115	-0.483	-0.614	-0.086	-0.288	0.451
Lack cooperation	-0.378	0.114	-0.342	**1**	-0.138	-0.026	0.282	-0.030	0.141	0.018
Lack of talent	-0.179	-0.958	0.115	-0.138	**1**	-0.028	-0.550	-0.047	0.346	-0.760
Lack of public transport	-0.082	0.242	-0.483	-0.026	-0.028	**1**	0.066	0.452	0.360	-0.225
Lack of info	0.085	0.572	-0.614	0.282	-0.550	0.066	**1**	-0.271	-0.233	0.196
Difficulty policy implement	0.275	0.188	-0.086	-0.030	-0.047	0.452	-0.271	**1**	0.694	-0.215
Unconcern people	-0.340	-0.166	-0.288	0.141	0.346	0.360	-0.233	0.694	**1**	-0.577
Other	0.110	0.584	0.451	0.018	-0.760	-0.225	0.196	-0.215	-0.577	**1**

Table 4.3: Variables correlation matrix of land use and transportation problems in developing countries

Table 4.3 shows the relationship between economy factor and political factor is relatively low. Thus suggest to us the relationship between economy factors with political factor. While the value of law problem and political factor is stronger with 0.62 compared to economy with 0.270. This is possible because politician makes policy and law. However, there is weak relation between politic factors with other factors. Lack of talent is strongly correlated with unconcern people with 0.712 and negatively correlated but strong with -0.791 with lack of info. This resembles that many problems in developing countries because of not enough skill worker and expertise in land use and transportation planning. In addition, there is weak correlation between lacks of talent

with economy factor. Hence, lack of talent and economy factor is not necessarily associated. The rise or downward of economy not necessarily contribute to lack of talent.

In addition to test the relationship between the factors in separated group based on colonization theory, correlation between factors in **non-colonized developing countries** and also **colonized developing countries** is calculated. The method, enable the research to understand the correlation between two different groups based on the theory of colonization. Based on the colonized developing country result, the correlation between unconcern people and law problem is strong with -0.721. This suggests that the law problem in implementing land use and transportation planning in colonized developing country most likely has relation to unconcern people. Economy factor shows weak relationship to political factor with -0.013 suggesting no association between them. It shows that it is not necessary to have strong economy to ensure success in land use and transportation planning. There is also weak relationship between economy factors with other factors.

In summary to the Spearman correlation test that used is that there is no relationship occurs between most factors in both non-colonized and colonized developing countries factor of land use and transportation planning failure. In Table 4.4 and Table 4.5 both tables shows in average weak relationship between each factors. Economic achievement is not compulsory a benchmark for developing country to depend on. For example, lack of talent contributes to lack of public transport because not enough skilled and educated transport planner to plan them.

Table 4.4: The correlation matrix for non-colonized developing countries of question one

Variables	Economy factor	Political Factor	Law Problem	Lack of cooperation	Lack of talent	Lack of public transport	Lack of info	Difficulty policy implement	Unconcern people	Other
Economy factor	**1**	0.270	0.624	-0.239	-0.316	-0.244	0.112	0.432	0.129	-0.283
Political Factor	0.270	**1**	0.620	-0.172	-0.240	-0.292	0.178	-0.043	-0.484	0.402
Law Problem	0.624	0.620	**1**	0.000	0.047	0.063	0.066	0.442	0.009	0.294
Lack of cooperation	-0.239	-0.172	0.000	**1**	-0.213	-0.251	0.380	0.239	-0.135	0.184
Lack of talent	-0.316	-0.240	0.047	-0.213	**1**	**0.747**	**-0.791**	0.293	**0.712**	-0.012
Lack of public transport	-0.244	-0.292	0.063	-0.251	**0.747**	**1**	-0.563	0.311	0.320	0.309
Lack of info	0.112	0.178	0.066	0.380	**-0.791**	-0.563	**1**	-0.207	-0.663	0.337
Difficulty policy implement	0.432	-0.043	0.442	0.239	0.293	0.311	-0.207	**1**	0.351	-0.050
Unconcern people	0.129	-0.484	0.009	-0.135	**0.712**	0.320	-0.663	0.351	**1**	-0.493
Other	-0.283	0.402	0.294	0.184	-0.012	0.309	0.337	-0.050	-0.493	**1**

Values in bold are different from 0 with a significance level alpha=0.05

Table 4.5: The correlation matrix for colonized developing countries of question one

Variables	Economy factor	Political Factor	Law Problem	Lack of cooperation	Lack of talent	Lack of public transport	Lack of info	Difficulty policy implement	Unconcern people	Other
Economy factor	**1**	-0.013	-0.358	-0.183	0.363	0.277	0.363	0.182	-0.110	0.124
Political Factor	-0.013	**1**	-0.283	0.175	-0.578	0.358	0.500	-0.035	0.353	0.511
Law Problem	-0.358	-0.283	**1**	-0.130	0.227	-0.563	-0.646	-0.245	**-0.721**	0.248
Lack of cooperation	-0.183	0.175	-0.130	**1**	0.354	0.235	0.393	0.286	0.326	0.156
Lack of talent	0.363	-0.578	0.227	0.354	**1**	0.177	-0.089	0.484	-0.207	-0.227
Lack of public transport	0.277	0.358	-0.563	0.235	0.177	**1**	0.275	0.667	0.661	-0.165
Lack of info	0.363	0.500	-0.646	0.393	-0.089	0.275	**1**	0.261	0.445	-0.054
Difficulty policy implement	0.182	-0.035	-0.245	0.286	0.484	0.667	0.261	**1**	0.583	-0.520
Unconcern people	-0.110	0.353	**-0.721**	0.326	-0.207	0.661	0.445	0.583	**1**	-0.392
Other	0.124	0.511	0.248	0.156	-0.227	-0.165	-0.054	-0.520	-0.392	**1**

Values in bold are different from 0 with a significance level alpha=0.05

Factor Analysis is used to reduce large amount of data. It is a data reduction method that can represent many variables to few factors. It is a method where an observed and unobserved variables that can be explain through model. The model will explain the variance through factors. Besides it makes data becomes more understandable and simple in this research, the use of Factor Analysis is to test a theory of connection between the variables. The correlation matrix explains the relationship between each variable to the other but doesn't defined causes. Since correlation only explains relationship and does not explain causes, factor analysis is conducted. In this research, respondents informed the research that there are 10 main factors contribute to the land use and transportation problems in developing countries. The goal of this method is to understand **unobserved variables** that can better explain all 10 factors.

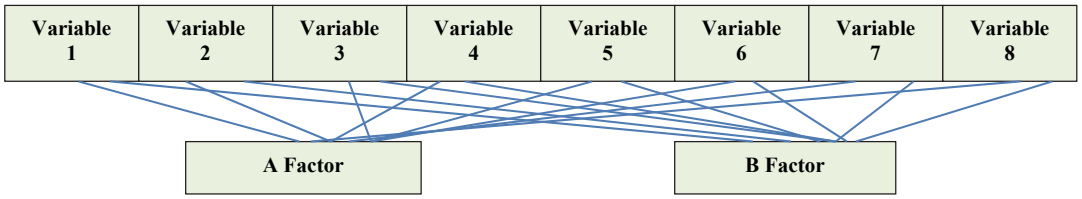


Figure 4.2: The concept of factor analysis used in this research

Initial step of performing Factor Analysis is to know the data is suitable for Factor Analysis or not. In this research, all data have numerical values and it is independent. In land use and transportation field for example, there are many factors involved. This makes our analysis results narrower and easier to interpret. According to Kline (1994), factor analysis was formulated by Spearman because it simplifies complex field by indicating the important variables. Factor analysis is an analysis method which is good to study the patterns of relationship among many dependent variables. The indirect

independent variables are labelled as *factors*. This research used XLSTAT software that runs many statistical operations including Factor Analysis.

4.4.1 Steps of applying Factor Analysis

Factor Analysis is used in this research as method to identify factors influences land use and transportation problems in developing countries. The analysis allows reduction of data into groupings of factors that allows research to recognize the relationship of the data into more meaningful and easier interpret data. It runs through simplifying the data (Kline, 1994). The correlation matrix produces by correlation analysis, factor analysis simplifying the complex correlation analysis data defined by factor loadings. According to Kline (1994), the loadings are the correlations of the variable with a factor. In the application of Factor Analysis, other statistic such as mean, the standard deviation and variance are initially calculated. Using the software, Factor Analysis can be used by data input in the Excel. In addition to perform the Factor Analysis, eigenvalues is the total variance of each factor. The variances are produced by the calculation of the squared standard deviation. Below are the main points in Factor Analysis that is important to understand in interpreting and analysing the data:

a) Correlation values and correlation matrix
b) Mean, standard deviation and variance
c) Eigenvalues and Eigen vectors
d) Scree Plot
e) Factor Loadings
f) Types of rotation

The eigenvalues are important to understand as the variance of the factors. The scree plot is used to plot eigenvalues and normally data is easier to understand based on the Scree plot by looking at the curves in order to find how many factors that are considered. Normally, eigenvalues in the average of 1.000 is considered as factors. The loading of the factor is the value explains the relationship between the factor and the variables. In the table, the loadings of the variables are given in four factor groups. The loadings for economy factor in Factor 1 is -0.253, Factor 2 is 0.225, Factor 3 is -0.642 and Factor 4 is 0.688. Based on the loadings, economy factor variables in Factor 4 are closer to the average of 1.000. The strength of the loadings helps this research to explain on the relationship of the variables. For example, developing countries law problem can influence other factor such as lack of public transport and unconcern people. In addition, the lack of cooperation can contribute to the difficulty of policy implementation.

Variables	F1	F2	F3	F4	Initial communality	Final communality	Specific variance
Economy factor	-0.253	0.225	-0.642	**0.688**	**1.000**	**1.000**	**0.000**
Political Factor	**-0.847**	-0.418	-0.206	-0.118	0.991	0.949	0.051
Law Problem	0.054	**0.863**	-0.390	-0.317	1.000	**1.000**	**0.000**
Lack of cooperation	-0.092	-0.291	**0.314**	-0.190	0.368	0.228	0.772
Lack of talent	**0.951**	0.202	0.158	0.173	1.000	**1.000**	**0.000**
Lack of public transport	0.079	**-0.549**	-0.164	0.010	1.000	0.334	0.666
Lack of info	**-0.610**	-0.392	0.354	0.307	1.000	0.746	0.254
Difficulty policy implement	0.233	-0.533	**-0.800**	-0.146	1.000	**1.000**	**0.000**
Unconcern people	0.575	**-0.596**	-0.206	-0.275	1.000	0.805	0.195
Other	**-0.798**	0.365	-0.124	-0.363	1.000	0.917	0.083
Values in bold correspond for each variable to the factor for which the squared cosine is the largest							

Table 4.6: showing values of each factor for each variable analysed

Based on the same data analysis this research finds economy factor fall into same factor group with other variables. Therefore, suggest that economy factor is not necessarily influential other factors in the problems of land use and transportation in developing countries. For further define loadings values, rotation is applied. Rotation of the loadings will influence low or higher loadings. There are several types of loadings. Using XLSTAT, Oblimin Rotation is used to rotate the loadings. According to Rummel (1967), the used of oblimin rotation are more flexible in finding correlation. The loadings in the axes below are the analysis of respondents of all developing countries in the research. The differences between performing rotation can be understood by comparing the two charts. The loadings are more disperse before rotations are applied to them. The results appear more clean and closer to higher or lower readings. The important of performing the rotation task is to allow factors are created in a correlated or uncorrelated conditions as shown in figure 4.3.

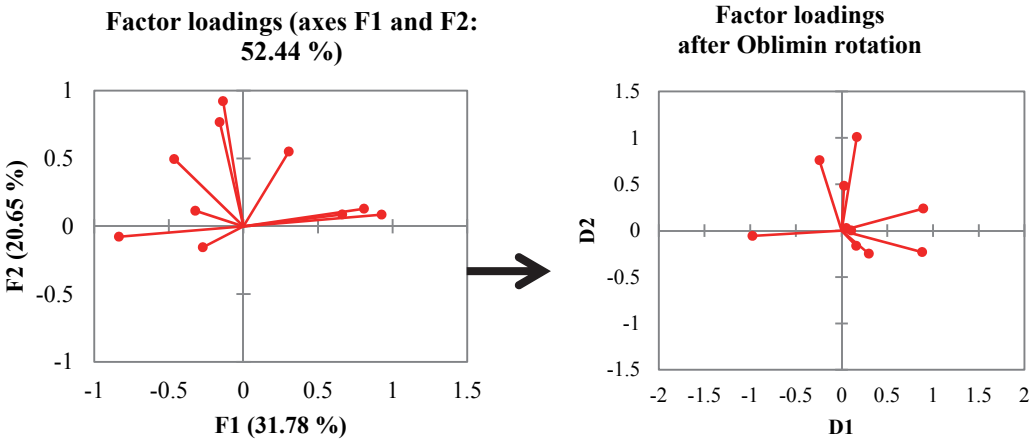


Figure 4.3: Factor loadings before rotation is on the left while after rotation is on the right

Table 4.7 are variables of analysis after rotation. After rotation, Factor 4 has 2 factors that are economy factor and lack of cooperation due to the significance of rotation process. Compared before the rotation, Factor 4 only have economy factor with less than 1.000. However, after rotation, the loadings become clearer as each of the factors is actually correlated to each other. Variables includes in the first factor group after rotation is political factor, lack of talent and other factors. The second factor group included lack of public transport, difficulty of policy implementation and unconcern people. Third group consist of law and lack of info problem. The last group consist of economy and lack of cooperation. From the result, developing countries problems in land use and transportation are contributed by factors that are related to each other.

Variables	D1	D2	D3	D4
Economy factor	0.049	0.027	-0.158	**1.014**
Political Factor	**0.893**	0.238	-0.245	0.021
Law Problem	0.159	-0.163	**0.928**	0.142
Lack of cooperation	0.104	0.002	-0.185	**-0.391**
Lack of talent	**-0.976**	-0.057	0.120	-0.005
Lack of public transport	0.026	**0.484**	-0.243	-0.022
Lack of info	0.297	-0.248	**-0.744**	0.028
Difficulty policy implement	0.166	**1.010**	0.192	0.205
Unconcern people	-0.242	**0.759**	0.066	-0.294
Other	**0.880**	-0.231	0.375	-0.067

Values in bold correspond for each variable to the factor for which the squared cosine is the largest

Table 4.7: Factor pattern after Oblimin rotation

Political factor and lack of talents seems to connect with each other. In addition, economy factor is not related to political factor in land use and transportation problems.

It also suggest that developing countries economy factor is not necessarily effect all other factors and obviously did not related to political factor as shown in the result.

In order to test the differences between colonized and non-colonized developing countries respondents result, this research separated the respondent's data into different groups based on the colonization factor. The same procedure is applied for this process. After factor analysis was applied to the data, there are six factor groups for each colonized and non-colonized developing country group. Table 3 and Table 4 represent the eigenvalue and variability of the analysis for both groups. The goal of getting eigenvalue action is to include enough variation in the model. The variability of the first factor (denote as F1) has the variability of 31.785% while the second factor (denote as F2) has the variability of 20.655%.

Table 4.8: Non-colonized developing countries Eigen value results before factor loadings

	F1	F2	F3	F4	F5	F6
Eigenvalue	3.178	2.065	1.608	1.078	0.363	0.121
Variability (%)	31.785	20.655	16.080	10.776	3.630	1.212
Cumulative %	31.785	52.440	68.520	79.296	82.926	84.138

Table 4.9: Colonized developing countries Eigen value results before factor loadings

	F1	F2	F3	F4	F5	F6
Eigenvalue	3.269	2.123	1.392	1.054	0.442	0.158
Variability (%)	32.692	21.232	13.924	10.545	4.418	1.582
Cumulative %	32.692	53.924	67.848	78.393	82.811	84.394

Rotations are then applied in order to make the loadings sharper. By observation to the plot, four factor groups are obtained for each group. The highest variability of factor is chosen for considerations and rotation. As a result of rotation, two factor groups that are D1 and D2 are formed for each non-colonized developing country group and colonized

developing country group as shown in Table 4.8 and 4.9. D1 and D2 are denoted based on characteristic of factors falls within the factor group. In colonized developing countries group the factors are more disperse while in non-colonized developing country group the factors are tendency in groups of certain factor. Based on the result, there are different factor pattern in both group of developing country. In order to explain the dimensions of the factor analysis result, factor names are given based on the character of the factor falls within dimension.

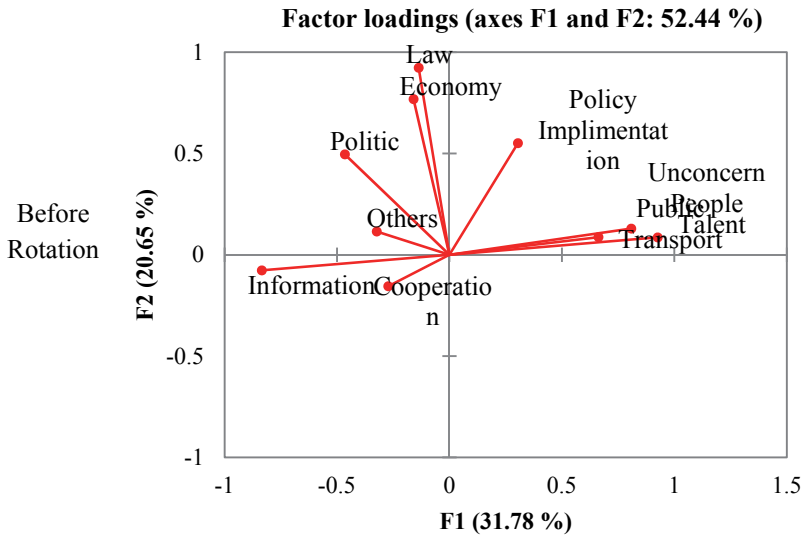


Figure 4.4: Factor loadings before rotation for non-colonized developing countries

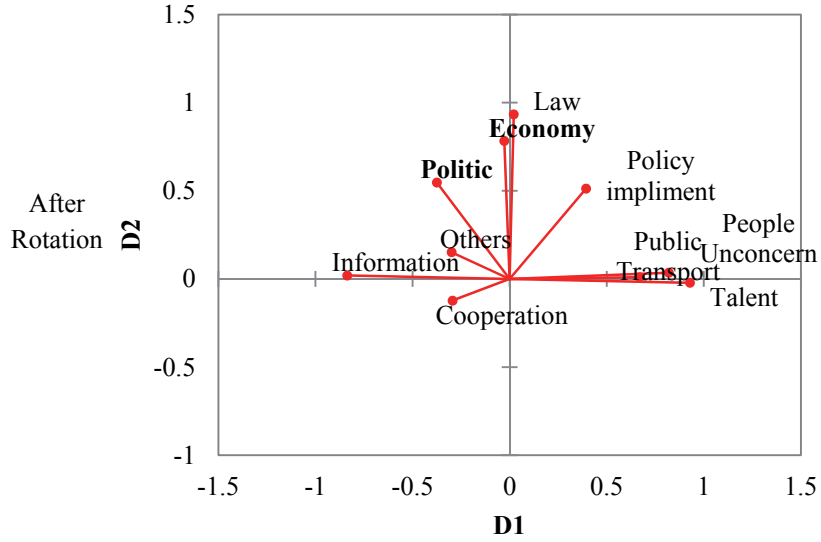


Figure 4.5: Factor loadings after rotation for non-colonized developing countries

Before Rotation

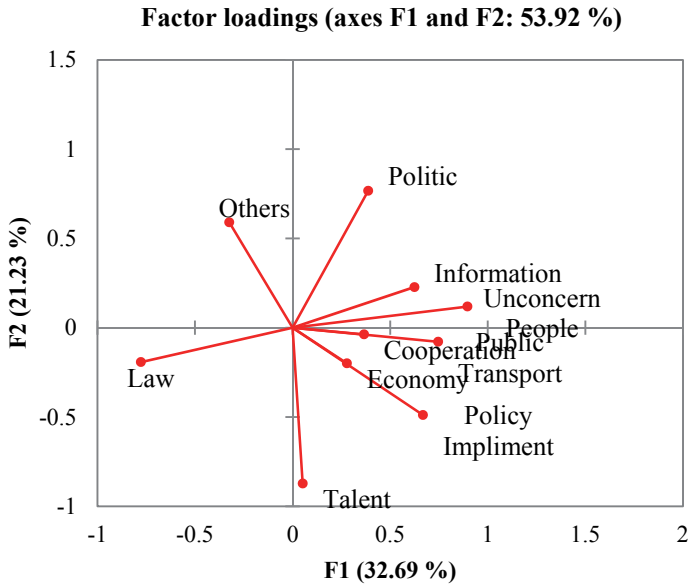


Figure 4.6: Factor loadings before rotation for colonized developing countries

After Rotation

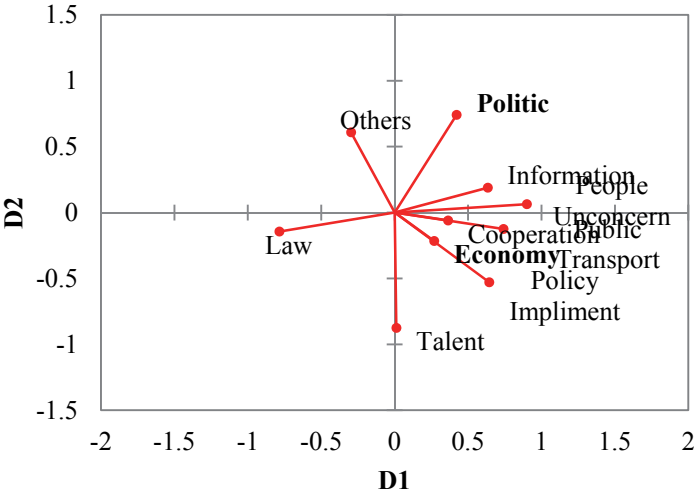


Figure 4.7: Factor loadings after rotation for colonized developing countries

After rotation, both groups produced two rotated factor groups as shown in Table 4.10 and 4.11.

Table 4.10: Factor pattern after rotation for non-colonized developing countries

D1(Peripheral Factor)	**Values**	**D2(Interrelated Factor)**	**Values**
D(Lack Cooperation)	-0.295	A(Economy Factor)	0.783
E(Lack Of Talent)	0.929	B(Political Factor)	0.547
F (Lack Of Public Transport)	0.669	C(Law Problem)	0.934
G(Lack Of Information)	-0.836	H(Difficult Policy)	0.513
I(Unconcern Of People)	0.820		
J(Others)	-0.299		

Table 4.11: Factor pattern after rotation for colonized developing countries

D1(Phase Factor)	**Values**	**D2(Performance Factor)**	**Values**
I(Unconcern People)	0.900	B(Political Factor)	0.747
H(Difficult Policy)	0.645	E(Lack Of Talent)	-0.875
F (Lack Of Public Transport)	0.742	J(Others)	0.609
G(Lack Of Information)	0.634		
A(Economy)	0.269		
D(Cooperation)	0.364		
C(Law)	-0.785		

Each group with two rotated factors are accordingly named based on the variables. For example, the first factor group after rotation for non-colonized developing countries are identified as peripheral factor. The other second group are named as interrelated factor. Peripheral factor means variables are mostly outliers in land use and transportation problems. The main variables such as political and economy are under interrelated factor. In other words, non-colonized developing countries economy factor is related to political and law factor in land use and transportation problems. Compared to colonize developing as shown in Table 4.11, political factor is separated into different group from economy factor. Instead, economy factor are related to unconcern people, difficulty of policy implementation and lack of public transport. The important point to understand is the existence of economy factor in D1 and the separation of political

factor in D2. D2 group is termed as "performance factor". It is because it is rely on the performance of policy makers and the number of talent factor.

In comparison between the two groups, colonization influences political factor of land use and transportation problems in developing countries. Instead, in non-colonized developing countries, there are relationship exist between economy and political factor. The pattern of problems shows that developing countries does not share the same land use and transportation problems. In Table 4.12, explains the most frequent failures reason suggested by our respondents regarding reason of land use and transportation planning unity in developing countries. The highest frequencies are listed as below:

Table 4.12: Frequency of failure reasons in land use and transportation unity

Reasons	2003	2004	2005	2006	2007	2008	2009	2010	2011	TOTAL
Political Commitment	2	1	1	2	2	3	0	2	3	16
Financial Constraint	0	3	1	3	2	2	1	1	3	16
Land use not strictly followed	2	3	0	2	0	2	1	2	1	13
Lack of public transportation	1	1	1	1	1	0	2	2	2	11
Land use doesn't function	1	0	0	1	2	0	3	1	1	9
Lack of strong leadership	1	3	2	0	1	0	1	1	1	10
No proper survey before development	1	1	3	1	1	1	1	2	4	15
Lack of budget	2	4	0	3	1	0	1	0	3	14
No continued political process	2	0	1	0	1	3	1	1	2	11
In coordination between ministries	2	0	1	2	0	0	1	0	2	8
TOTAL	14	16	10	15	11	11	12	12	22	123

Political commitment and financial constraint are the two main factors disturbing the unity. In general, political and economic factor is vital. Other reasons given by respondents are also reflected politic factor such as lack of strong leadership,

no continued political process and in coordination between ministries. There are also other reasons given related to economy factor such as lack of budget.

4.5 Summary

Respondent's feedback on land use and transportation problems in developing countries is analyses. This research finds there are variations of reasons to land use and transportation problems. Some countries have very old system that could not be renew to the lack of budget. Some countries have no strict implementation so communication between ministries failed to integrate land use and transportation plan. Land use and transportation planning is also failed because of lack of political support. As conclusion, improvement in economy is not necessary to ensure land use and transportation problems to settle. Using Factor Analyses, significant results are obtain showing there are differences between developing countries based on the result analyses according to the factor group.

Through colonization, many delays in the colonized country can be found such as lack of knowledge among administrator, segregation and bias in the social community and political styles inherited from colonial style. More than just about economy reason, colonization moulds some developing countries following colonial style. Quantitatively, Factor Analysis result shows that colonized developing countries have political issues related to its land use and transportation problems while in non-colonized developing countries economy, lack of talent and law problem are more concern. So these are the reason contribute to the problems in land use and transportation in developing countries. Finally, this analyse also proves that there are variation of problems of developing countries.

CHAPTER FIVE
COLONIZATION INFLUENCES TO LAND USE AND TRANSPORTATION PROBLEMS

5.0 Influences of Independence

In previous chapter, quantitative data are analysed using the Factor Analysis. The main findings are there are differences between colonized and non-colonized developing countries especially in the political factor. In this chapter, this research inquire respondent to give comments on the problems to unite land use and transportation planning in their country. The open ended question allow respondents to write any opinion related to land use and transportation problems in their country. This is to ensure, no answer are being structured and important information are gathered equally in this survey.

Independence does not only mean a country gains its physical freedom from colonization but it also mean the starting point of independent country system. Before independence was achieved, a colonized country inherits foreign system of their colony as to ease the colony during its colonization. Although that there is no affirmation of a hundred percent of foreign system use, colonization means a country was being controlled other than themselves. Assuming that, this research wants to understand the influence of the period of independence gained by developing countries into the problems of land use and transportation. Especially, when shorter independence period means that they have shorter time to plan over system. Initially this research assumes that longer independence period has different kinds of land use and transportation problems compared to shorter independence period. However, this research will not go

into detail to what aspect of colonization has influence land use and transportation and will only analysis the difference given in the independence period of each developing country.

5.1 Text Mining Data Analysis Method

In this chapter, qualitative data of the research survey are analysed. Using KH Coder software, words are extracted from the respondent comments using the text mining methodology. This is to recognize factors of failure in land use and transportation through extruding frequent words and developing word links. KH Coder software is an analysis tools for text data mining and it is able to perform the co-occurrence network application. In this method, the software extracts word to represents 10 frequent words for land use and transportation planning failure. Qualitative data is accumulated from respondents of the survey from the year 1999 until 2012. Therefore, this research separated the data into two groups that is from 1999 to 2006 and the other group is from 2007 to 2012. The reason of the separation is to understand the influence of world economy recession occurs in 2007 towards respondents answer.

Respondents of this survey are professionals from developing countries participated of Japan International Cooperation Agency workshop. The qualitative data are accumulated from 1999 to 2012. Respondents are required to give explanation on a question related to land use and transportation problems in developing countries. There are no restrictions in number of words and it is an open ended question. The respondents are allowed to write anything related to land use and transportation problems occurred only in their countries. The reason is to collect as much as information possible on land use and transportation problems in developing countries as all of the respondents is

involved in land use and transportation field. The background of participants including working experience, age, family history and others are not considered in respondent's selections as it is not important to determined land use and transportation problems. However, experience may influence the knowledge of respondent. The samples are random limited to the participants of the program.

During analysis, results are divided into two groups that are developing countries with independence year below 65 years and another group is independence year with 66 years. It is based on World War 2 period as point of reference. This is to understand whether a country needs more time to plan for land use and transportation. Developing countries gained independence before World War 2 is considered countries that developed over land use planning first hand before automobile expansion. This group has earlier independence year and possible longer time administering their government. Whilst, the second group of developing countries below 65 years of independence are countries developed land use planning along with the development of automobile especially in the 1970 to 1980's. This is to understand the needs of convenient development time towards land use and transportation planning in developing countries. The numbers of countries participated are worldwide covering almost all regions including Asia, North Africa, Saharan Africa and South America.

Regions	Number of countries participated
Asia	15
North Africa	10
Saharan Africa	13
Europe	4
South America	7
North America	1
Central America	5

Table 5.1: shows regions of respondent involved in the survey

Table 5.1 shows 231 respondents from 55 developing countries including Egypt, Malaysia, Indonesia, China, India and African developing countries responded to the question regarding land use and transportation problems in developing countries. All respondents' comments are then transferred to Microsoft Excel and text format according to year of the participants.

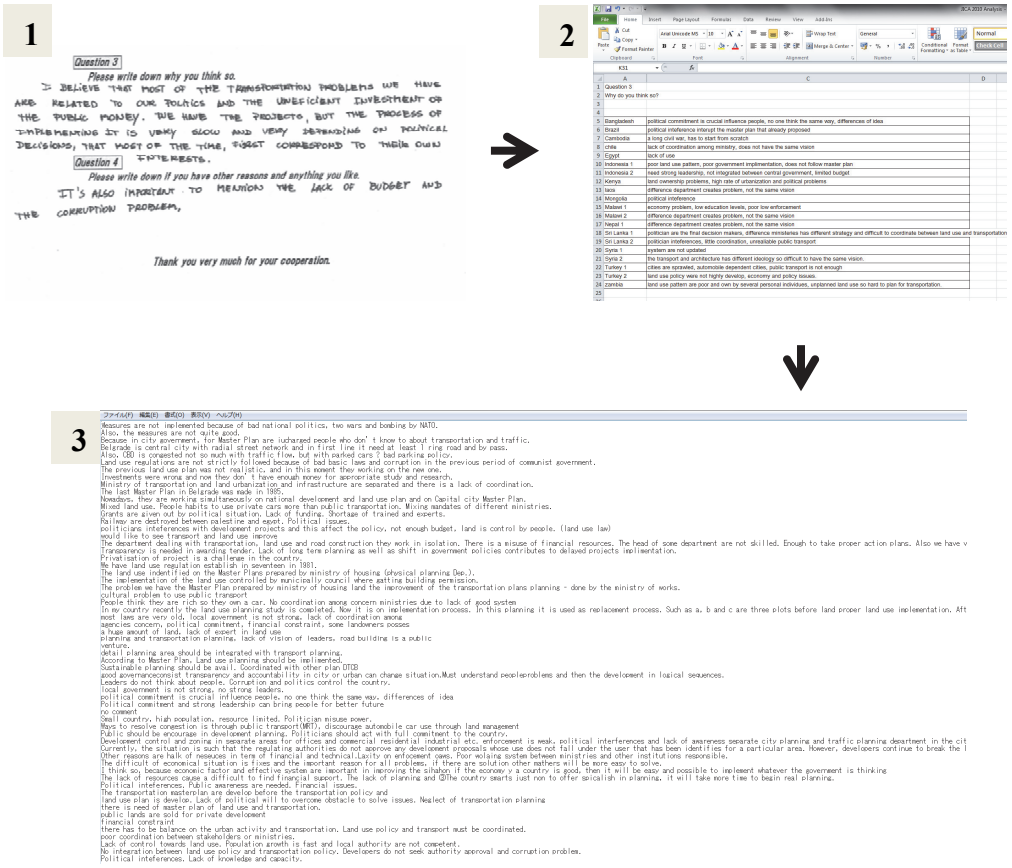
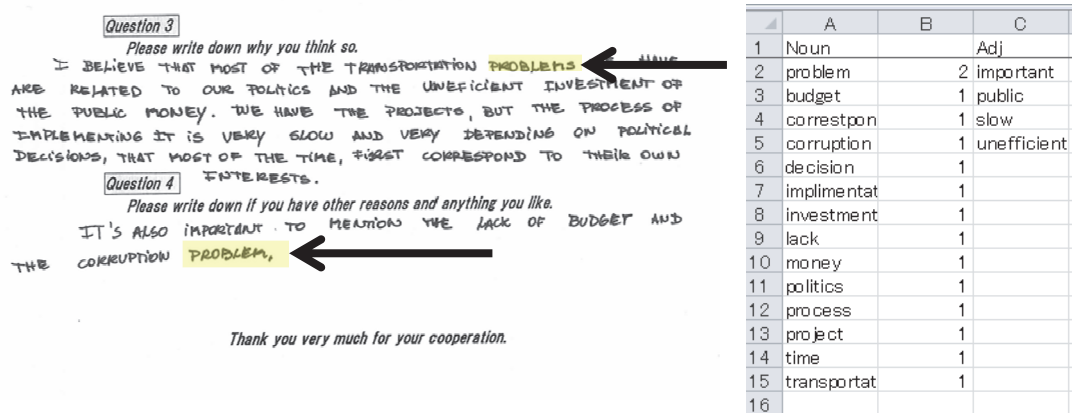


Figure 5.1: Process involved from raw data to excel files to text. format for text analysis

From Microsoft Excel, respondent's comments are transferred to text format (txt.) as KH coder software is using text format to analysed words. Words are extracted from respondent comments. There is several option of text mining and one of them is co-occurrence network. The co-occurrence network convert the respondents answer based on relationship between the words. After that, the diagrams are evaluated based on nodes centrality and one of the method is based on degree of centrality. Based on degree

of centrality, we can understand the number of links that a node has between the words. This is created on the number of ties associated to each other and creates a form of popularity. This represent through colour code ranging from dark purple, light purple, pink, white, light blue and blue. The ranges of colour represent word strength of the index in the degree of centrality. The number of word links appear in the network to understand the streght of words can be controlled. Normally using KH Coder, it is automatically set to 60 words.



Question 3

Please write down why you think so.

I BELIEVE THAT MOST OF THE TRANSPORTATION PROBLEMS HAVE ARE RELATED TO OUR POLITICS AND THE UNEFICIENT INVESTMENT OF THE PUBLIC MONEY. WE HAVE THE PROJECTS, BUT THE PROCESS OF IMPLEMENTING IT IS VERY SLOW AND VERY DEPENDING ON POLITICAL DECISIONS, THAT MOST OF THE TIME, FIRST CORRESPOND TO THEIR OWN INTERESTS.

Question 4

Please write down if you have other reasons and anything you like.

IT'S ALSO IMPORTANT TO MEANTION THE LACK OF BUDGET AND THE CORRUPTION PROBLEM,

Thank you very much for your cooperation.

	A	B	C
1	Noun		Adj
2	problem	2	important
3	budget	1	public
4	correstpon	1	slow
5	corruption	1	unefficient
6	decision	1	
7	implimentat	1	
8	investment	1	
9	lack	1	
10	money	1	
11	politics	1	
12	process	1	
13	project	1	
14	time	1	
15	transportat	1	
16			

Figure 5.2: Example of words selected using Text Mining Analysis such as Noun, Adcjectives and Verbs

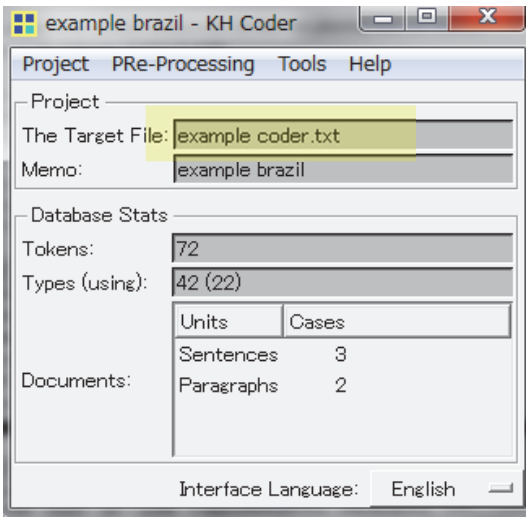


Figure 5.3: A file in the format of text (.txt) is uploaded into KH Coder software. The number of sentences and paragraph are detected.

5.2 Results of Analysis

The table shows the most frequent words represents factor in land use and transportation unity in developing countries. Table 5.2 shows the word government is the most frequent words found in the frequency list. Respondent in 1999 until 2006 suggest 56 words of government while in 2007 until 2012 there are 25 words of government. After 2006, the word budget and politician can be seen in the 2007 until 2012 columns but not before 2007. Hence, suggests to us that the financial reasons are not so obvious before the world economy crisis. From the initial analysis, the failure is very much related to word government, formulation of regulation, the rapid development and the implementation. Hence, it is comprehensible that the level of land use and transportation is related to the government organization and their goal in land use and transportation planning.

Table 5.2 show the highest words from the text mining analysis. Comparatively, respondents before 2007 suggest no financial related words with land use and transportation problems compared to respondents after 2007. But both groups of respondents suggest the strong word co-occurrence in government with land use and transportation problems in developing countries.

Table 5.2: Frequency of 10 highest words from the respondent answers

Year (number of words)	1999-2006	2007-2012
Most frequent words represents factor of failure in land use and transportation planning in developing countries.	Government (56)	Government (25)
	Ministry (47)	Development (24)
	Regulation (43)	People (20)
	Development (39)	Ministry (18)
	Master (39)	Policy (18)
	Law (33)	Budget (17)
	Policy (27)	Coordination (17)
	People (26)	Law (17)
	Traffic (26)	Master (14)
	Implementation (25)	Politician (14)

Further analysis enable us to understand deeper the situation of land use and transportation planning in developing countries. Initially, respondents' countries of origin are based on their independence period. Independence literally means free from outside control. Therefore, independence in the terms of land use and transportation planning means "free to perform self-system and planning". In other words, the country itself plans over own land use and transportation system. Malaysia Town Planning Act for example is only renewed in 1976 that is after 19 years of independence. This proves that a new independence country needs time to plan over self-system considering number of skills, resources and financial issues in applying new system after independence. Therefore, it is important to understand the differences between developing countries land use and transportation problems between developing countries with shorter or longer independence period. All respondents' country of origin is listed as Table 5.3 based on the country independence period since 1945 that is soon after the World War Two.

Table 5.3: Developing countries independence period since 1945

Below 65 years (29 developing countries)			**66 years and above (26 developing countries)**		
Algeria	Tunisia	Tanzania	Ethiopia	Panama	Jordan
Cambodia	Uganda	China	Albania	Paraguay	Mexico
Cameroon	Bahrain	Myanmar	Bhutan	Peru	Mongolia
Egypt	Bangladesh	Laos	Bolivia	Philippines	Vietnam
Ghana	Kenya	India	Brazil	Saudi Arabia	Nepal
Jamaica	Malawi	Pakistan	Bulgaria	Syria	Nicaragua
Malaysia	Mauritius	Zimbabwe	Chile	Thailand	Haiti
Rwanda	Zambia	Yugoslavia	Colombia	Turkey	Indonesia
Senegal	Mozambique	Palestine	Guatemala	Venezuela	
Sri Lanka	Romania				

Based on our analysis as stated in table shows there are 29 developing countries categorized under developing countries with below 65 years of independence. On the right side of table are 26 developing countries with more than 66 years of independence. All respondents' answers are converted from text to networks through co-occurrence network based on each independence period group.

The high index will turn to dark purple and larger nodes represent higher frequency words. Referring to both result analyses, the word "government" represent as large nodes that illustrate the high frequency of words in land use and transportation planning failure. The results of analysis are words such as policy, budget, people, law, knowledge and leadership are highlighted in the diagram. KH Coder using the co-occurrence network (links) analysis existed between government and policy, leadership and commitment, people and knowledge, law and knowledge. People and knowledge is link thus suggests to us the level of knowledge among people about land use and transportation planning contributed to its failure. Larger nodes means higher frequency of words and thicker lines means stronger edges. Below is diagram containing words suggesting failure of land use and transportation planning in developing countries with below 65 years of independence.

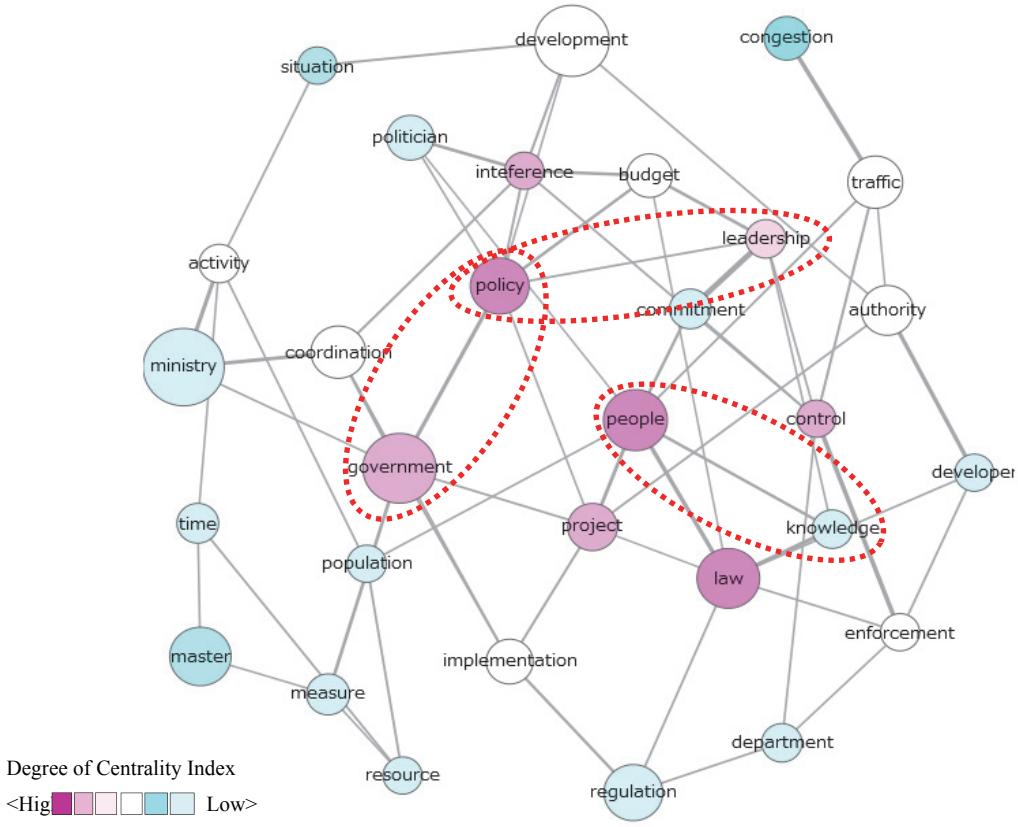


Figure 5.4: Network edges shows links between frequent word and strength for developing countries with below 65 years of independence

Figure 5.4 shows the number of words appears in the network edges. The strongest words appear in the edges are development followed by government, people and law. The word budget appears in the edges but do not appear as the strongest words in the edges. The word government explains the important of the government in developing countries with shorter independence. This means, these countries need to improve government administration and attending a people-centric policy. The word policy is also link to the word leadership suggesting the problems of land use and transportation is related to poor leadership in shorter independence country. As the time of

independence is short, the number of people who is knowledgeable and skill full in land use and transport as to solve the problems is low.

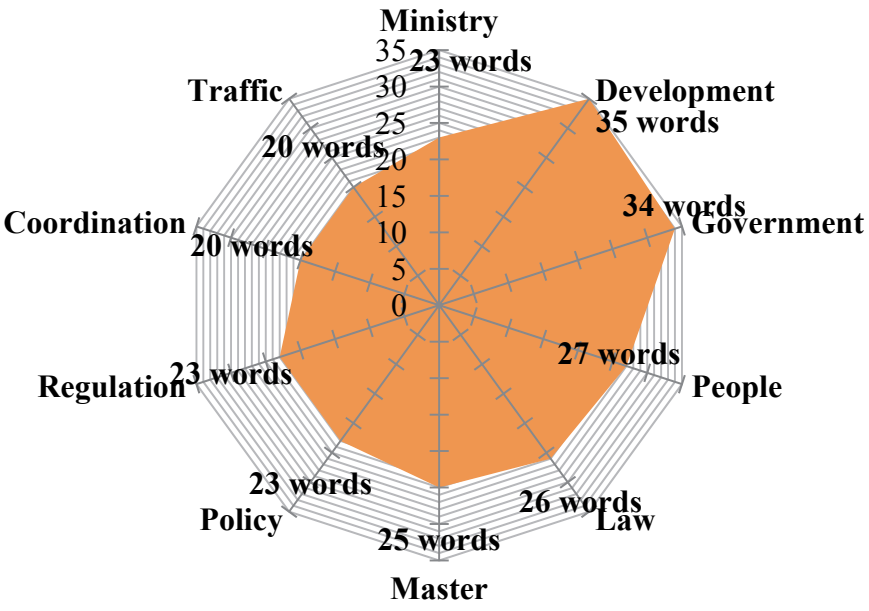


Figure 5.5: Frequency of words appear in the developing countries with below 65 years of independence network

Developing countries with independence more than 66 years are also analysed using text mining analysis. In the network edges shows the word government is relates to the word policy. Furthermore, there are existence of network (links) between money and politics, knowledge and authority. In contrast with the previous analysis in diagram, in this diagram the word knowledge is relates to word authority as reason of failure in land use and transportation planning. In addition, politics and money appears to have links thus suggest to us the influence of politics in economy factor. Figure 5.6 shows the word budget appears as one of frequent words for developing countries with more than 66 years of independence. While, there is no doubt that the word government also appear in the network due to the important of government in land use and transportation in developing countries. Comparatively, developing countries with shorter

independence period are more concern to problems related to formulation of policy and the system itself.

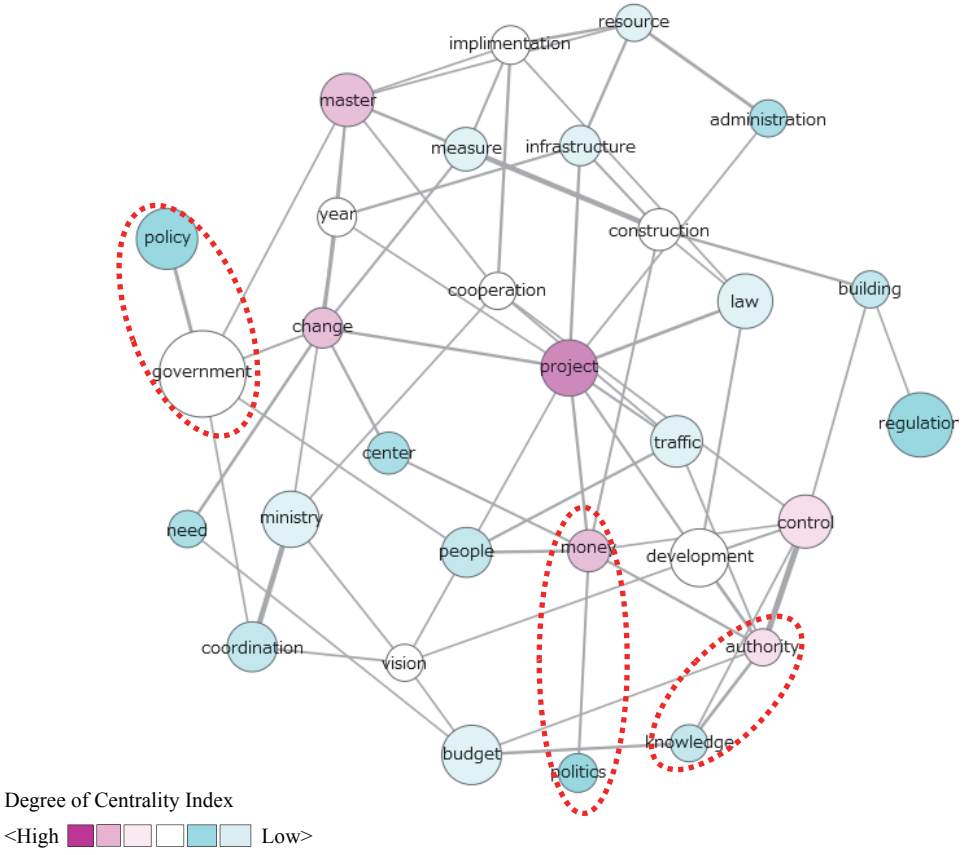


Figure 5.6: Network edges shows links between frequent word and strength for developing countries with more than 66 years of independence

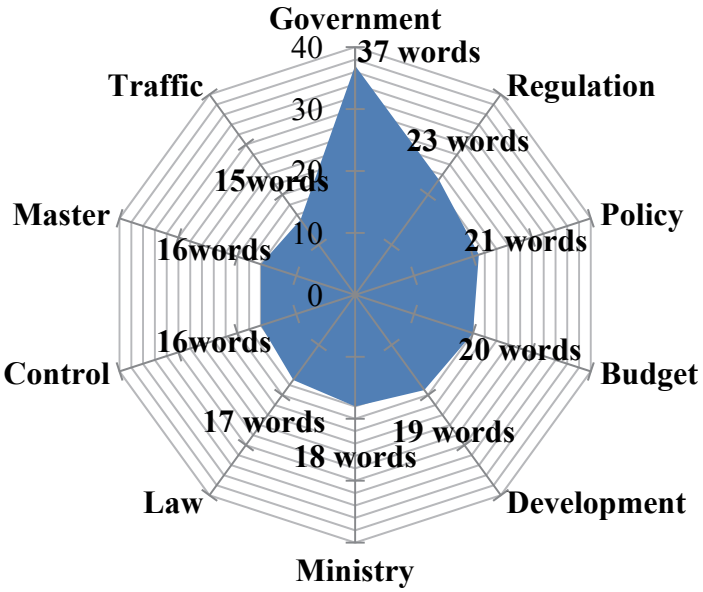


Figure 5.7: Frequency of words appear in the developing countries with more than 66 years of independence

In general, both analysis results as shown in diagram are similar but not identical. However, the differences between the two diagrams depend on the networks (links) between the words. For developing countries with longer independence period has longer time to plan over their land use planning.

5.3 Summary

Using text mining analysis, we are able to understand important key points on land use and transportation problem in developing countries through co-occurrence network. However, in the analysis, it is difficult to justify the differences between shorter or longer independence based on the word links. This is because, the word appears in the links is almost identical. Nevertheless, links between the words are somewhat different. In conclusion, it is possible to understand the problems related to land use and transport in developing countries. Shorter and longer independence

influences to land use and transport problems in developing countries depends on the word links. Longer independence show government, policy and budget as reason to land use and transportation fail. While shorter independence shows government, people and law. Although it is not precise but able to suggest significant words related to each group land use and transportation problems. Based on analysis result, we found that independence period can give differences in the word links between factors. Further research will allow more detail explanation of the problems.

CHAPTER SIX
CASE STUDY IN TAIPING TOWN, MALAYSIA

6.0 Introduction

Colonization influences in the current land use and transportation problems can be understood in the differences between previous colonization town planning and the current town planning perspective. As previous town planning planned during colonization was for the purpose during colonization, it is seen that current automobile development clashes with the colonization planning style. In addition, the inheritance of colonization town planning system as well as its style in developing countries may contradict with the current needs. Hence, in this chapter of this research would like to understand the influence of colonization in Taiping town located in Malaysia as a case study. To elaborate, in many developing countries, land uses and the urban form of its cities are shaped since centuries ago. This has leaded our study to the connection of "colonization history" influences to the setting of current developing countries cities. What are colonization influences to the current land use and transportation problems?

In Malaysia, there is a great influence of the British in the architecture and modern town development during their colonization (Kahn, 1997). According to Maidin (2012), the model of British town planning are not only adopted in Malaysia but also other British colonies like India and Australia. An additional survey is conducted in Taiping town located in Malaysia to understand the impact of British town design during colonization towards current road user in Taiping town.

6.1 Land use and Transportation in Malaysia

The reason to conduct this *preliminary survey* is to confirm the analysis result and to investigate the aspects of colonization influences through interviews, observation, traffic count and questionnaires. This is to understand the problems occurred in the case study and the adaptation from colonization influences into the current condition. According to OECD, Malaysia is a developing country and has achieved 72.2% of urban population in 2010. The population of Malaysia in the same year is about 28.3million people. The rapid development has contributed and affected the transportation system in Malaysia. In 2010, the numbers of private cars is more than half of the total population of Malaysia in 2010 that is about 17.4millions (Noresah, 2012). Before British intrusion in 1874, the traditional land systems are differed among states and the land use pattern are formed based on the local activity. So, the system implemented before 1874 in different states is not covered in this research as the objective of this research is to understand the influence of recent colonization into the current land use and transportation problems. In addition, the modern town planning was introduced by the British since Malaysia was colonized by British for almost 65 years. The interference of the British into the local system is due to the needs of security to the country (Yaakop, 2010).

During the British colonisation, focus of development is being given to specific areas especially where tin mining can be found, agriculture as well as ports. These cities became focus of development due to the benefits attained by the British. Areas located near tin mines and ports are quickly developed and become the city centre and centre of administration. It has also encouraged many commercial areas to be developing surrounding those areas. According to Yaakop (2010), the British influence has shaped

the political system, multi ethnic society and the government. This research also believes that it also gives influence to the land use and transportation problems Malaysia face currently. Figure 6.1 shows land use and transportation related factor relationship to colonization. Firstly, economy of Malaysia is influence by developed countries. For example, the major industrial and agriculture development are already formed since colonization period. Although the country has gone through major transformation, it cannot be denied the influence of British policy in the process including involvement and investments of British companies. Secondly is the influence of British education system especially towards the town planners. Thirdly is the position of planners in the decision making where planners are just advisors. Therefore contribute to the final relationship that is the poor policy making due to political pressure. This is a result of severe political influence due to the social characteristic which in some way has to do with colonization. However due to the limitation of this research, fortunately it will be covered in future research.

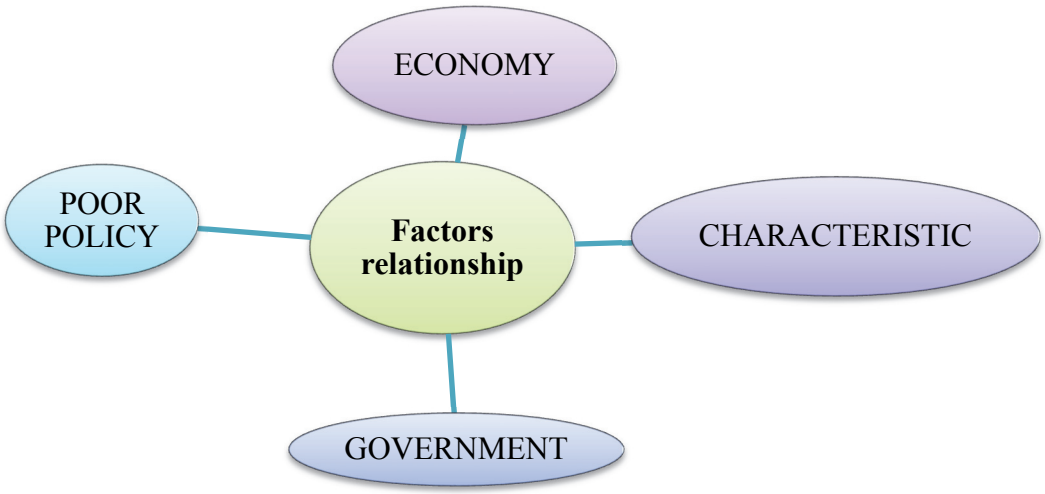


Figure 6.1: Factors relationship to land use pattern and transport development in Malaysia

6.2 Land use System in Peninsular Malaysia

The three tier of the national development planning system plays an important role in shaping the development planning of the nation. Peninsular Malaysia and Sabah Sarawak are implementing different system. This preliminary survey will only explain the system used in the Peninsular Malaysia. At present, Malaysia land use system referred to the National Development Planning includes the Vision 2020, National Planning, Regional and State Planning and followed by the Local Planning. As evidence, the Town and Country Planning Act were only amended in 1976 that is after 19 years of independence. Basically the system acknowledges the power of the State Authority in determining planning of the state and local level. The development plans are used as tools of planning while planning controls are used as controlling method.

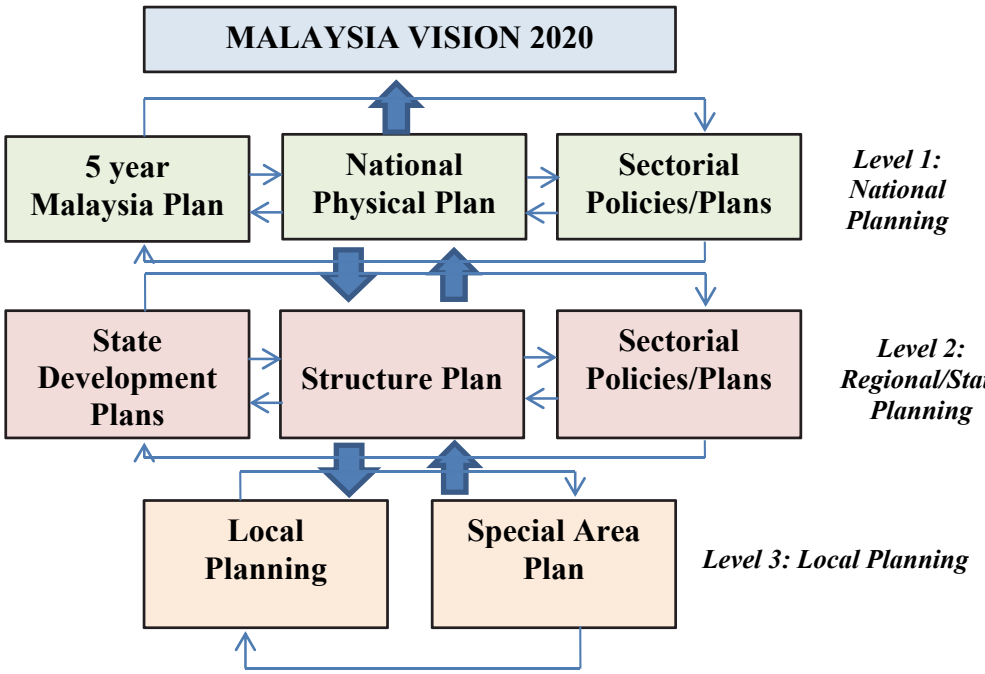


Chart 6.1: Malaysia vision and level involved in town planning

Source: Federal Department of Town and Country Planning Malaysia

The economic planning unit (EPU) headed by the National Planning Council headed by the Prime Minister as the head of council coordinates planning between federal and state planning council (SPC). According to Zakaria (2003), conflicting development plans between state and implementing agencies and local authorities creates problems in land use planning. The conflicting land laws between state and federal is also mention in Awang (2008). At State level, the State Planning Committee (SPC) handles all planning activities advices the states on matter related to land development. The State Town and Country Planning Department advices the State Planning Committee while the State Economic Planning Unit is also involved in the preparation of development plans. At the very bottom of the hierarchy is the local authority which is the working body of the whole system will control and plans development of lands and buildings.

However, the land use system at this time could not be assume as a total copy of British town planning style because it is now has went through a lot of changes and influences from other countries system. Therefore, the influences of colonization into Malaysia land use system are difficult to define in surface but it is important to understand that it has shaped the condition of the current system. According to Zakaria (2003), the past national policies and historical events shaped the development pattern of the country. Furthermore, Zakaria (2003) stated that the imbalance urbanization between states due to the British colonial rule that is ethnic and regional bias influences the economy activity and transportation development. As a refute, the influences of colonization into current land use and transportation problems can be seen in several physical parts of the town planning system for example road pattern design and land use pattern developed during colonization.

6.3 The Transportation System in Peninsular Malaysia

The role of transportation planning comes in between the responsible of the national and the local planning. At the national level, Ministry of Transport are responsible in shaping the direction of the transportation system in Malaysia. This includes the latest effort of the government to improve the public transportation in Malaysia. The numbers of private car registered with the Road Transport Department of Malaysia (2012) rise from 8,506, 080 in 2009 to 9,721,447 in 2011. This has shown an increase of 12.50% from 2009 private car registration.

Private automobiles are widely used in Malaysia due to many reasons. According to Muhamad (2011), among the factors contributed to the wide us of private car is the income factor, provision of various motor assembly facilities and also the involvement of Malaysia government into automobile manufacturing. According to Hassim et. al (2008), the public transportation in Kuala Lumpur is only utilized at about 20% compared to other cities in Asia like Tokyo and Seoul. According to a report for the Government Transformation Program (GTP), the modal share of public transport decline to 12% only in 2010. A research done by Abdalla et.al (2007) stated that the percentage of train users in Kuala Lumpur, Malaysia is not as high as private cars. 34% of car uses has only 27% access to train while only 19% to motorcycle. This shows that although that urban rail services conveniently connecting suburban areas and urban areas, it has failed in making accessibility easier. The poor accessibility towards public transport has encouraged more people to use private cars.

The “Land Public Transport Commission” or well known as SPAD is one of an example of a government body that helps to develop the direction public transport in Malaysia. Currently, the Land Public Transport Commission or well known as SPAD

are given responsibility to plan over land public transport in Malaysia under the latest Land Public Transport Act 2010. The Greater Kuala Lumpur / Klang Valley Land Public Transport Master Plan are the main SPAD project comprises a series of Subsidiary Plans which include Urban Rail Development Plan, Bus Transformation Plan, Taxi Transformation Plan, Interchange and Integration Plan, Land Use Plan; and Travel Demand Management Plan. The Prime Minister Department through the Economy Planning Unit (EPU) are responsible onto the visionary parts of transportation system in Malaysia. The implementation body are the Ministry of Home Affairs, Ministry of Works, Ministry of Transport, Ministry of Entrepreneur Development and the local government of each state and district. Problems of land use and transportation can be found as shown in Table 6.1.

Table 6.1: Main Land use and Transportation Problems in Malaysia

Land use	Transportation
Integration of planning between State planning and local planning authority in conducting land development plans.	High usage rate of private vehicle.
Urbanization and imbalanced of development growth	Lack of efficient public transportation.
Economic development expanding development growth	Lack of transportation system that is all inclusive.

6.4 The British System

The land system inherited from the British is the Torren System from Australia. The Town and Country Planning Act of 1976 resemble a brief of town planning act of the British Town and Country Planning Act of 1971 (McCoubrey, 1988). Despite the inheritance of act, the application of the British town planning style shaped the land use pattern and transportation system especially at certain town developed during the British

colonization. This research focus on the implication of the British planning style in land use and transportation problems particularly the direct physical implication to people such as road design and land use pattern. Although, Malaysia has moved forward and improvised the system, the current land uses patterns and roads are still remaining utilised by Malaysians. The grid iron pattern roads that can be found in most towns developed during British colonization are still being used by the current road users. Therefore, it is important to understand the problems of land use and transport caused by the road design and planning. Table 6.2 explains about British colonization impact.

Table 6.2: Research hypothesis about British colonization impact to current road user

Characteristic	Before 1957	After 1957
Land use pattern	British segregates and creates towns based on land uses and ethnicity activity to secure safety, security and order.	Land use pattern are influenced by economic growth, government policy on urban development and automobile oriented cities.
Transportation	Grid Iron Pattern road was built to ease security and safety of the town.	Road pattern in town still used the grid iron pattern with larger extended road shoulder, lanes and traffic lights to ease traffic movement.

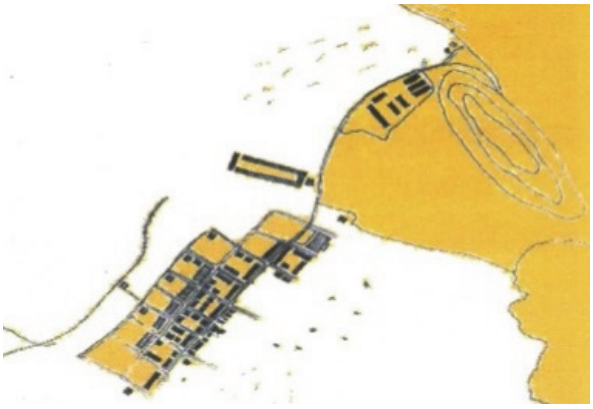
6.5 The Modern Taiping Town Develop by The British

There are several town develop by the British as administration and urban areas such as Taiping, Ipoh, Penang and Kuala Lumpur. Taiping was among the first British administration town located in the north part of Malaysia. This town is known as Taiping that means “Peaceful”. Taiping is one of the earliest modern town develop by

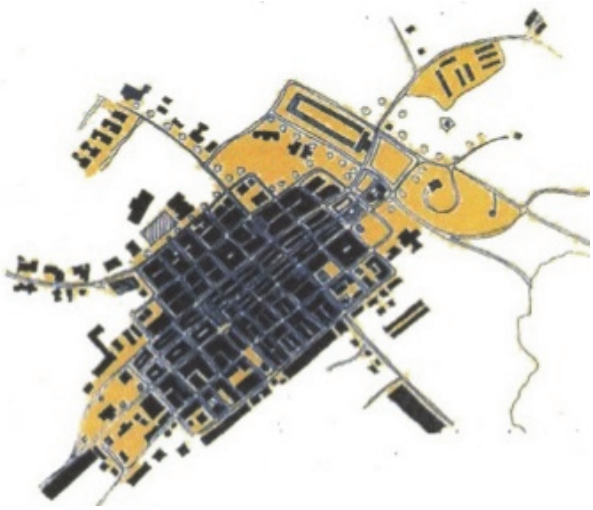
the British. As an administration town for the British, Taiping was developed complete with administration building, hospital, prison, museum, zoo and also commercial areas that connect through road and rails. The development of modern Taiping town was among the earliest and many Malaysia "first" can be found in the town. Before the arrival of the British, Taiping was a well-known town in the 1800 for its tin mining industry and many Chinese clan as well as local Malays involved in the industry. However, the development of the first "modern town" was constructed by the British colony in the 1880's is to accommodate the needs of security for the British.

Despite of the reasons to developed Taiping, British development on Taiping formed its modern land use pattern and transportation system. One of the developments planned by the British is the grid iron pattern road system. It can be seen in the placing of commercial areas and administration, the planning of residential of the Chinese clan and other ethnics living separately according to activities and also the designs of the road to ensure security and safety of the town. The British planning has shaped the current Taiping town.

Taiping Town in the 1850



Taiping Town after 1900



Taiping Town in 1950

Figure 6.2: Taiping Town development from 1850 to 1950

Source: Special Area Plan for Urban Heritage Taiping Town 2010

6.6 The Land use and Traffic System of Taiping

A research was conducted by FIA Research of Malaysia funded by Khazanah Malaysia to understand the streets history that was built by the British in Taiping town. According to the research, the grid iron pattern design was develop based on the horizontal and vertical roads. It is develop based on building apart 200feet to ease transport within the town. The construction of the road was developed in much planned

system where it considers much aspect especially safety. This is because; Taiping town was twice burned by fire in 1878 and in 1880.

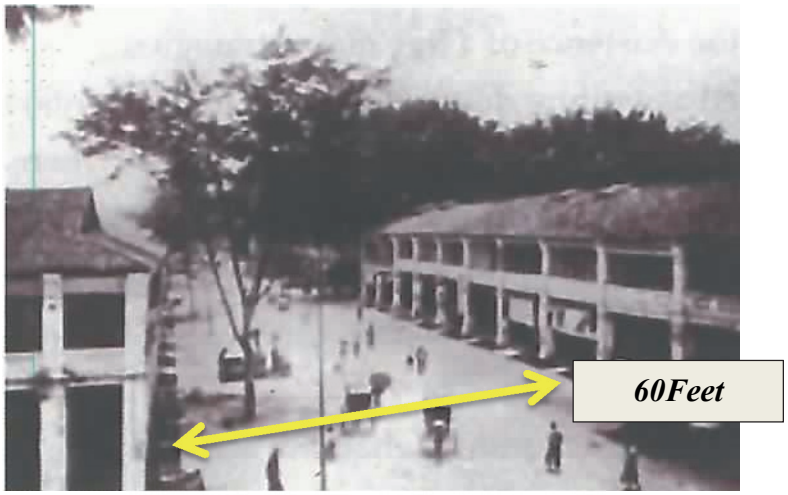


Figure 6.3: Main Street of Taiping in 1880 known as Jalan Kota

Source: Mr Anuar Isa of FIA Research Consultant of Malaysia

Another unique consideration made during construction of the road system is the consideration of town physical elements such as cemetery, hospital reserved, houses and trees. The physical element is also used as natural boundaries separating townships within the town. Based on FIA research, landmark is used as guidance in naming the streets for example Market and Station. Currently, the influences of the names given in the past especially during British colonization give such photographical impact to road users. For example, the Market Street quickly image road users of markets while Station road images road users of train station. The grid iron pattern is not a new road design introduced in Taiping town. It was introduced in many great cities around the world. According to Southworth and Ben-Joseph (1997), the regular Roman grid street patterns were seen in Bologna, Verona and Naples. In addition, the construction of the streets also assists in military strategies as well as for subdividing land purposes. Therefore, the

development of road system is very important for town development and it is used not only as connectors but serving many purposes of the town. As a comparison, development of streets before the arrival of automobile and after the arrival of automobile is certainly differed in many aspects. For example, roads are paved and construct to suit the needs of pedestrian are shorter and allows pedestrian to reach shops easily. Unlike development of road after automobile era, the road designs are fitted to the needs of automobile for example in the width and length of the road. It is seen that grid iron pattern design is not suitable anymore. The mismatch between road design before and after automobile is the focus of this research in suggesting the influences of colonization into current land use and transportation problems in Taiping town.

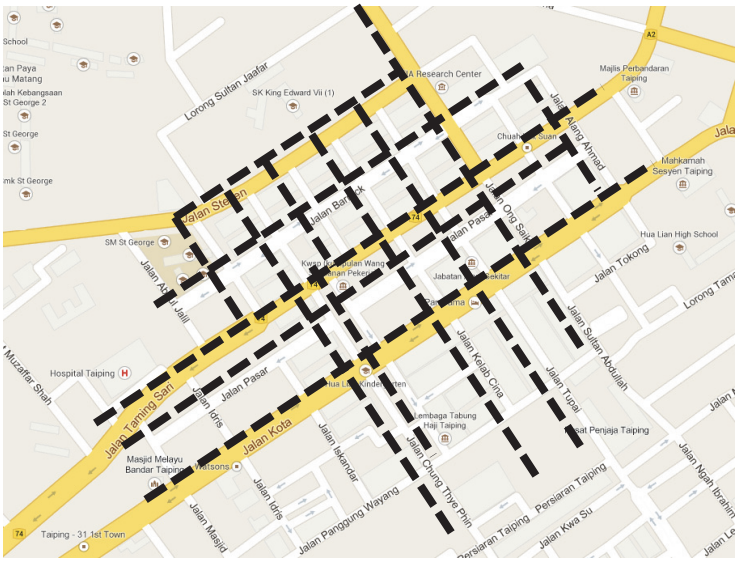


Figure 6.4: The grid iron pattern road design in Taiping town is currently used by road users.

6.7 The Grid Iron Pattern Road Problems

Street is used as medium of transportation besides rail, sea and air. Street pattern is able to influence the movement and needs of people. The increase of automobile on street influence the kind of street pattern builds in a town. According to Southworth and

Ben-Joseph (1997), there are several types of road patterns in suburban areas that are the grid iron found since 1900, fragmented parallel found since 1950, warped parallel found since 1960, loops and lollipops found since 1970 and the lollipops on a stick found since 1980. The grid iron pattern road is with highest number of intersections compared to other pattern of street. Therefore, Rifaat et.al (2011) found that grid iron pattern road encourages more crash risk as it increase exposure especially in a great mix land use areas. The lack of privacy resulted by heavy through traffic volume makes grid iron pattern unsuitable to the current trend of transportation. Therefore, the grid iron pattern is a problem to a town with high volume of automobile.

According to the Taiping Local Plan published in 1986, Taiping town suffers from traffic through problem at junctions that is not controlled by traffic lights. The local authority of Taiping has designed over traffic circulation using on the grid iron pattern road. Based on the report, road divider and traffic lights are used to navigate cars movement from crashing. One way route is also introduced at main roads to ease movement of automobile. However, the approach of Taiping local authority in 1986 is inclined towards accommodates the increase of automobile. For example, the volume of through traffic in the 1986 report suggests 2016 during peak hour at Jalan Taming Sari will increase to 16713 based on projections. The report proposed for an elevated road to accommodate the increase traffic volume. In addition, the 1986 report also suggest that lanes are added and parking is avoided to accommodate traffic. But currently, in 2013 there is no elevated road constructed within the town as there are needs of preserving the urban image of Taiping heritage British architecture. The types of the road in Taiping town are collector road and local road. In Malaysia, the size of collector road is about 6.7 meter lane for traffic while the local road is about 6.1meter lane designated

for traffic. The Larut Matang Perak Darul Ridzuan 2015 Local Report suggests that different land use has different impact to traffic volume in Taiping. Current land use pattern is shown in Figure 6.5.

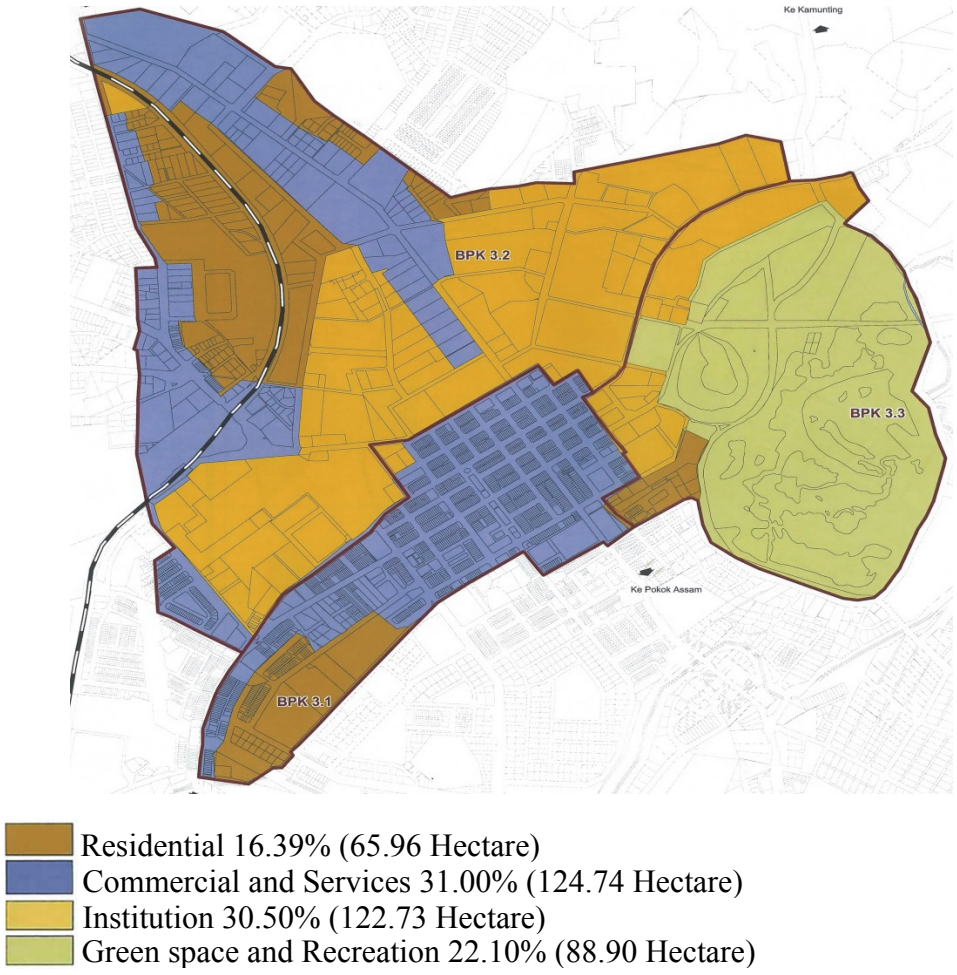


Figure 6.5: Current land use pattern in Taiping Town

Source: Larut Matang Perak Darul Ridzuan Local Report 2015

Type of Building Use	Number	Traffic Generation (%)
Main generator		
Mall	38	3.2
Market	3	0.2
Medium generator		
Hotel	7	0.6
Restaurant	74	6.2
Financial Institution	21	1.7
Offices	100	8.3
Post Office	1	0.1
Police Station	1	0.1
Education Institution	40	3.3
Entertainment	5	0.4
Clinics	25	2.1
Stores	30	2.5
Low generator		
Residential	39	3.2
Services	402	33.5
Commercial	194	16.2
Workshop	20	1.7
Subject to condition		
Parking spaces	7	0.6
Empty building	123	10.2
Collapse building	71	5.9
TOTAL	1207	100.0

Table 6.3 : Building usage in Taiping town area and the traffic generation percentage

Source: Larut Matang Perak Darul Ridzuan Local Report 2015

Based on the 2015 local report, Table 6.3 shows the traffic generation derived from mall are higher with only 38 number of mall with 3.2% traffic generation. In contrast, services building with highest number of building with 402 generate about 33.5% of traffic. Therefore, the increase number of mall will increase the percentage of traffic in Taiping town. The current traffic flow in Taiping is two way. The two way traffic is currently used in the grid iron pattern road of Taiping town. The high percentage of commercial and services land use also contribute to high traffic volume within Taiping town.

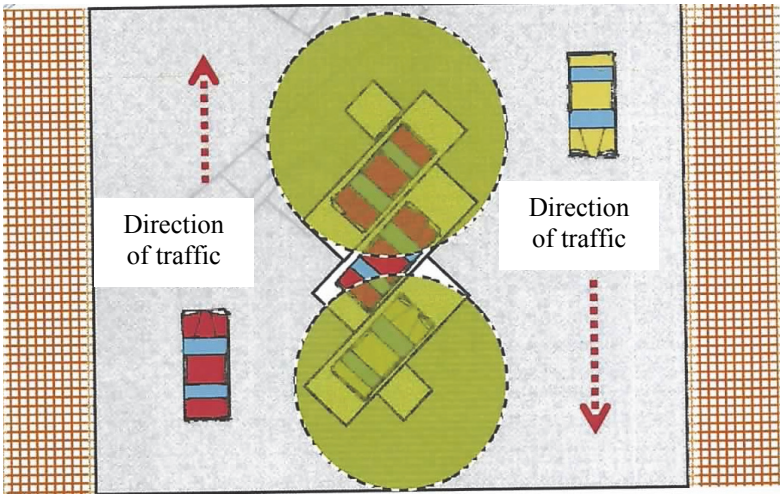


Figure 6.6: Two way traffic flow that can be found in Taiping town with middle area for parking

Source: Larut Matang Perak Darul Ridzuan Local Report 2015

According to the Special Area Plan for Urban Heritage Taiping Town (2010), major architecture style and the design of town are greatly influenced by European. Lee et. al (2013) stated the cultural spaces such as the townscape design and architecture building styles of Taiping town are influenced by colonial planning. The development of the town expands into a grid iron street pattern forming junctions which allows the British administration to secure each block of building with no trouble. The short building blocks appear to assist the British control towards Taiping town in terms of safety as well as sanitation purposes. However, the current high traffic volumes conflict with the original purpose of the grid iron pattern road developed by the British. The different purpose has resulted problems in traffic movement and unsuitable for safety of the pedestrian as it is more exposed to danger, high running traffic and complicated.

The British planned over Taiping town for administration and commercial purposes. That is why, the percentage of administration and commercial land uses are

high compared to residential areas. According to the Larut Matang Perak Darul Ridzuan Local Report of 2015, residential located within Taiping town boundary are recognized as medium and low density. The report stated that low density is categorized as 30 residential units per hectare while the medium density is categorized as 60 units per hectare. This suggests Taiping town is not a high density town with major population living outside Taiping travel in and out from Taiping town. Therefore, it is important to plan over efficient transportation system to accommodate the volume of traffic coming in and out from Taiping town. The current public transportation within Taiping town is buses and taxis as shown in Figure 6.7.

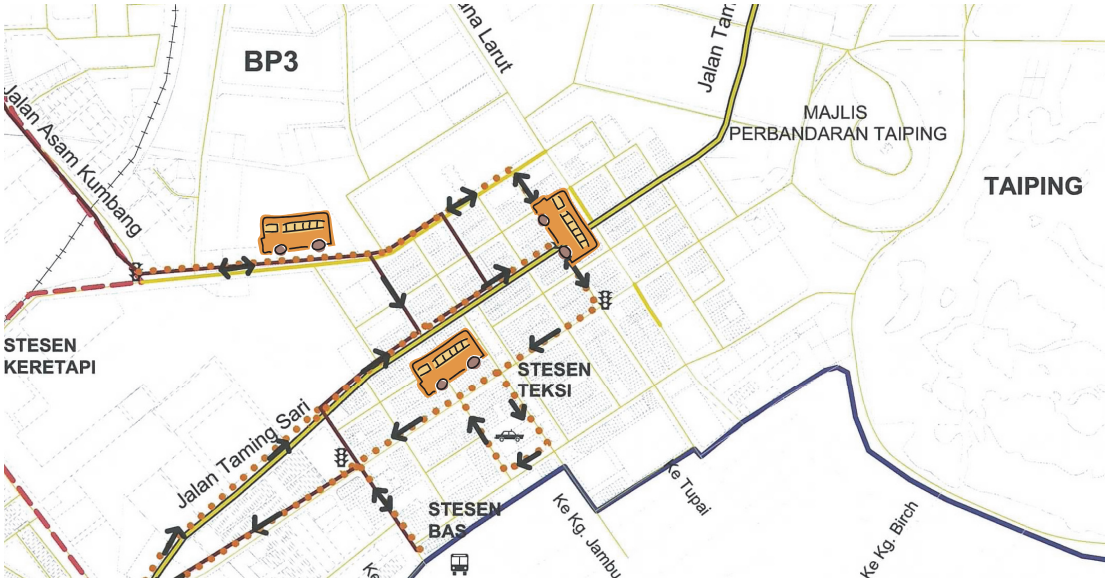


Figure 6.7: Public bus route within Taiping town

Source: Larut Matang Perak Darul Ridzuan Local Report 2015

Based on the report, the public bus route does not cover the whole area of Taiping town. Therefore, it is doubted that road users able to change transport from private to public buses as not all routes are covered by the facility. The conflict of traffic circulation in

Taiping town as a result from the existence of many junctions resulted problems as the number of traffic arise every year. In addition, the conflict of land use pattern since most of the residents living outside Taiping town contribute to a high daily traffic volume coming in and out is using the existence grid iron pattern road. Therefore, this research finds colonization factor did influence the land use and transportation system of Taiping town.

Figure 6.8 : British colonial building structure still remains utilized by the current local government of Taiping

Clearly, the end of colonization period has gradually makes changes to the style of town planning in Taiping town. However, the increase usage of automobile in Taiping town changes the pattern of land development as well as design of the traffic system. In summary, the town centre that is comprises of the main commercial area, recreational area, government offices and administration are using the road pattern design during colonization while the other new development area outside the town

centre consist of residential and new commercial area are using the new road pattern accommodating the automobile needs.

Table 6.4: The influence of British in summary

	Influences of British Town Planning	Problems	Influence to land use or transportation problems
Land use	Land use pattern	Location of residential influences trip generation and mode of choice in travelling.	Major people tend to used private vehicle to do daily activity.
Transportation	Road Pattern	Old road pattern needs to accommodate larger number of automobile increase.	Increase the number of vehicle on the road creating congestions.

6.8 Preliminary Survey on Current Behaviour of Road Users in Taiping Town

Field research is conducted to understand the problems of land use and transportation in Taiping town. Both non participant and participant observation are used as research strategy. The interviews are done in a semi-structured way so that information obtained is better and enable detailed response from the respondents.

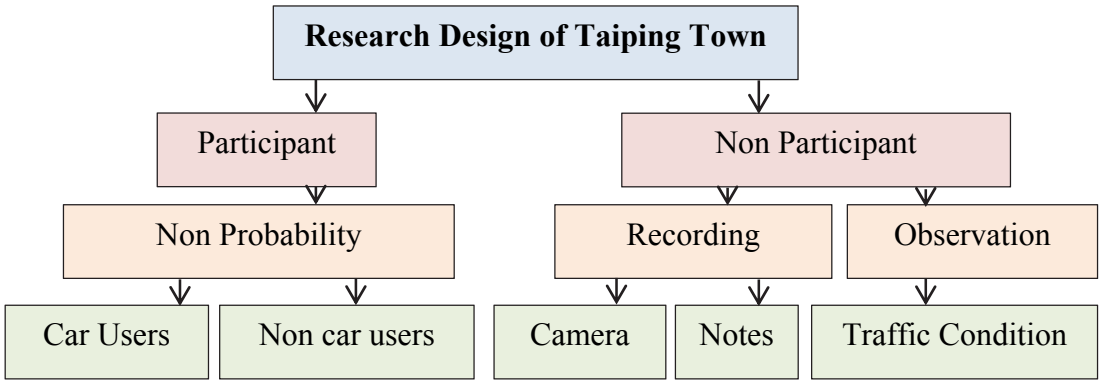


Chart 6.2: The research design

The non-participant observation involves data recording using video camera and camera. Observations are done towards the condition of traffic in day time during

working hours when most road users occupy the road. The type of camera shot is medium shot that allows better view of the road condition including building location, road and vehicles. This is to understand the pattern of travelling and problems face by the road users. Data is also recorded in notes so that every problem is carefully taken into consideration. Traffic count is also conducted at specific spot where initial observation was made at places with high volume of traffic. This is important to understand the problems of transportation system in Taiping town.

Participants involved are selected through non probability sampling method that is judgemental sampling. Children and person unable to decide their owned travel are excluded in the sample. However, person who does not drive but using public transportation or decided their transport to work is considered regardless of culture, family background and work type. 10% sampling error is accepted and allowed in the sample with 50/50 split of person in Taiping town chances as respondent in the survey. Therefore, the amount of sample size for 95% confidence level is around 90-100 person with a population size 100,000 estimated within the boundary of Taiping town.

The objective of this preliminary survey is to understand the “pattern” of travelling from residential to daily destination in Taiping town. The number of respondent managed to gather in the preliminary survey are 103 and 86% of them are from the working age group that is between 20 years old to 59 years old. This is the target respondent group owned private vehicle and be able to decide their own travel by themselves and not by others. However, the number of non-car user collected in the sample is low because of few factors face such as suspended bus operation due to company shut down and no co-operation with non-car user respondent. Due to lack of

resources during data collection, other related researches and trusted sources such as the Local Plan and District Plan of Taiping are used to support the data used in this analysis.

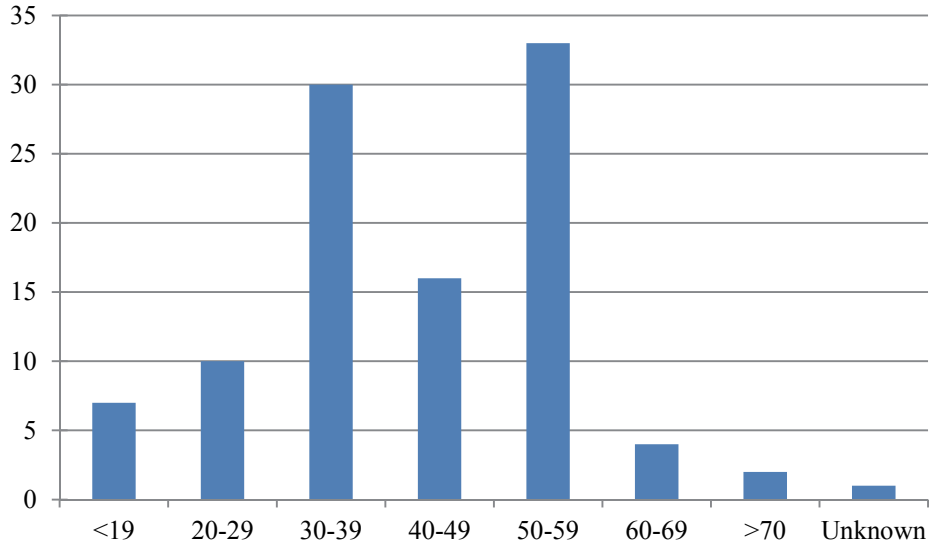


Chart 6.3: Age of respondent involved including car user and non-car user

In this survey, 29% of the respondent lives 5km from their working place while 70% lives more than 5.1km from their working place. The radius of 5km from the Taiping municipal council building is the radius considered as boundary of Taiping town developed during colonization period in this study. Most of the respondent lives in the sub urban areas that are located outside of town. Respondents were asked about their **daily trips** from residential to working place which is located in Taiping town. In the survey, 61% of the respondents used cars to go to work while only 8% are using public transportation. Public bus and taxis are the only public transportation in Taiping town. Surprisingly, 60% of the respondents has never ride the bus. Further investigation and interview found that the causes of the low percentage using public bus are contributed by these factors:

a. Availability of bus service on time and the distance of bus stop near house and the office.
b. Comfort of using private vehicle and not using the public vehicle.
c. Dislike long waiting time.
d. Unpredictable weather condition.
e. Undecided route planning and sudden changes of trips before and after work.

6.8.1 Result of Preliminary Survey

Although this finding could not represent the case study due to the limitation of samples, the findings enable to give concise perception about colonization and the current land use and transportation problems in developing countries town like Taiping. This research applies the non-probability sampling for sample is selected to refine target group participated by willingness in the survey inclusive respondents using car daily to work place or Taiping town or has lives in Taiping more than 10 years.

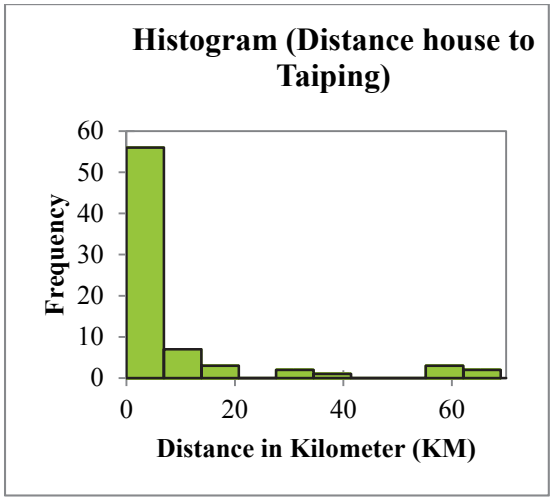


Figure 6.9: Location of respondent's residential using car average is less than 10km

The number of respondent who drives car to work or Taiping town mostly stays less than 10km from destination. According to study made by Kamba et. al (2007), Malaysians dependability on private automobile are because of travel time, routes are not covered by public transport, comfortable, save and frequency of public transport services.. In addition the locations of residential are less than 10km only. Based on observation, travel time in Taiping town within 10km only takes about 15 minutes to 20 minutes during peak time. Therefore, it is very comfortable using private car. According to the Local Plan of Taiping, traffic congestions only occur at several nodes in Taiping town during peak hour. However, the recent development of many commercial areas nearby Taiping town gives scares to the local council with the rise of private automobile and poor public transportation. In addition, the number of family member among private car is at the average of 4 people. It has increase the necessity of car ownership.

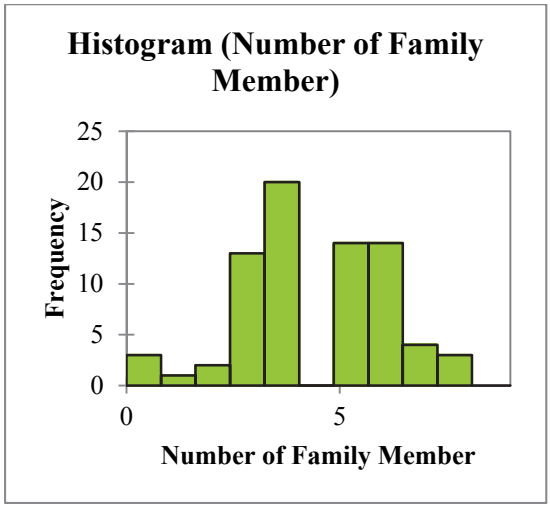


Figure 6.10: The number of family member using car as daily transportation to work or Taiping town.

The number of family member also influences the needs of owning a private car in Taiping town. According to the interview, as public transportation is poor parents needs to use own car to send children to school and for other necessities. According to Luo et. al (2007), the rising income level influence the rise of car user as the length of trip gets further from daily destination. In addition, Hook and Replogle (1996) also associated with the investment of the country in automobile industry resulting cheaper local cars. This is true as the price of local car and overseas brand car both locally assembled are difference by RM25, 000. Based on the survey among car users found that there are correlation between numbers of family member with salary. This shows, car users may also influenced by the needs of big family member with amount of salary obtained.

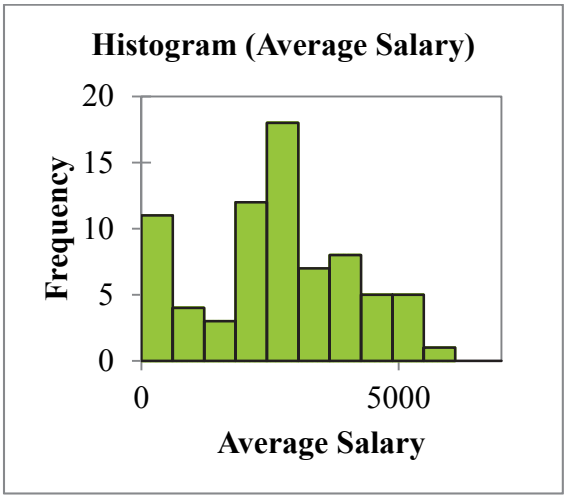


Figure 6.11: The respondent salary among car users

Based on interview done, the cost of sending children to school using school bus in Taiping is about RM60 per month for 1 child. If a parents has 3 child, the average amount for transportation will rise to 10% of parents with RM2500 salary average.

Variables	Distance house to Taiping	Average Salary	Number of Family Member
Distance house to Taiping	**1**	0.061	0.179
Average Salary	0.061	**1**	**0.236**
Number of Family Member	0.179	**0.236**	**1**

Table 6.5: Correlation for car users for several variables in understanding the relationship between them

Looking at the scatter plot between number of family and distance of house to Taiping showing that majority of respondent living near to Taiping has the average family member between 3 to 6 people in a family. The influence in the number of family member do not limited to specific distance. Hence, private cars usage is important for bigger family although location of residential and working place is near. Further interview and observation is made towards the route chosen by respondent in this research.

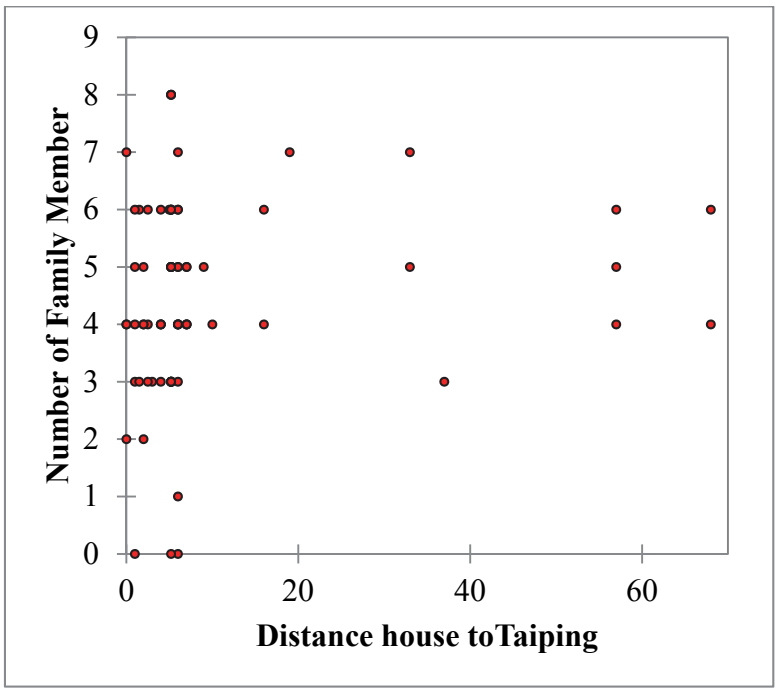


Figure 6.12: Scatter plot showing the number of family member and distance from house to Taiping among car user.

103 respondents participated in this survey was asked about their daily route to Taiping. Figure 6.13 shows there are 7 routes found as most favourability route to Taiping town.

a) Route A1, B1 and B2 from Kamunting area (6km from Taiping town)

b) Route C2 and C3 from Kampung Boyan area (3km from Taiping town)

c) Route C1 and C4 from Simpang and Air Kuning area (7km from Taiping town)

The favourability of route chosen above is based on few factors that are:

a) Route with less traffic lights and junctions.

b) Route with less traffic volume.

c) Route nearest to the destination.

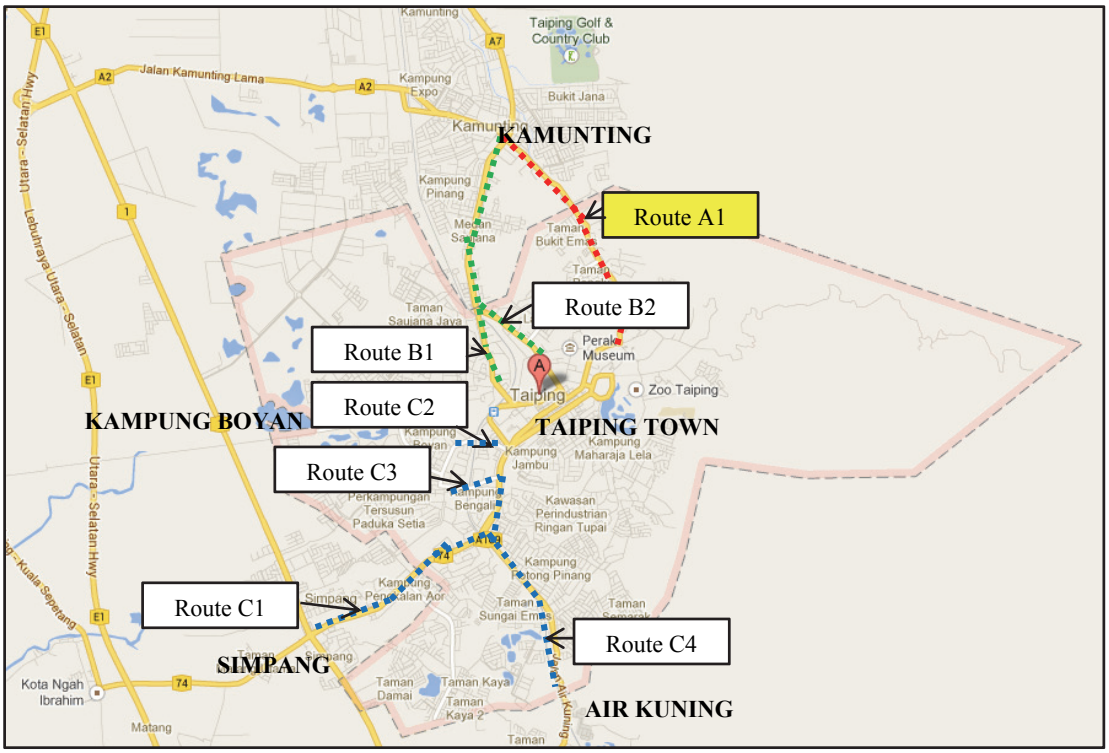


Figure 6.13: Favourability route chosen by respondent from residential to daily destination in Taiping town

Based on the survey among car users, 31% of the respondents are using **route A1** to Taiping. This is the most favourable route chosen by respondent. It is followed by **route B1 and B2**. This area are among areas where most residential located surrounding Taiping town. In addition, Lin and Yang (2009) found that different density give different effects to travelling pattern. The location of road user's residents in the survey has influence the use of private vehicle. According to the survey, road user's lives 5km to 8km are able to drive to their work place in Taiping town in less than 20minutes during peak hour. This is convenient travelling compared to other developing countries like Manila and Bangkok (Gakenheimer, 1999). Hence, it gives us a clearer picture about the nature of road users in Taiping town.

Private vehicle usage among road users occurs due to several reasons. According to Dielman et.al (2002), the number of family members also influence the mode of transport used. Hence, most road users preferred to use private vehicle due to the lack of availability of the bus service. The use of private vehicle allow husband to send their wife to work, children to school and pick them up again in the evening. Survey shows, 80% of respondents wants to use the public bus when it is improved. Therefore, Taiping road users are **lack of alternative in mode of transport.**

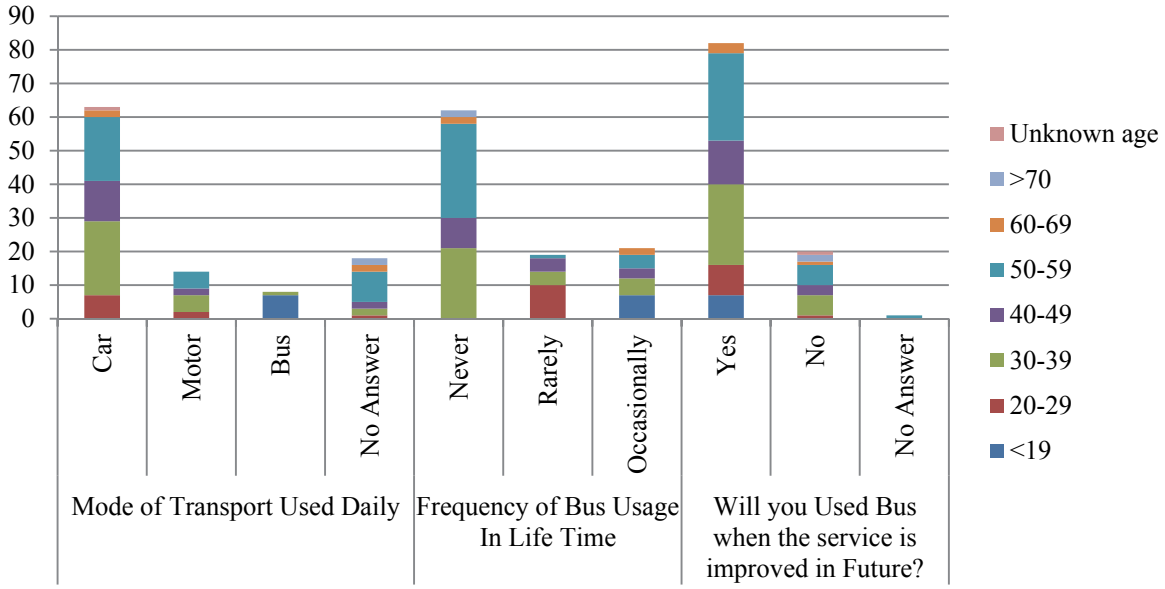


Chart 6.4: Result of survey among road users in Taiping town in 2013

According to the survey, besides poor public transport service, there are additional problems as result of poor balance in land use and transport that are:

a. The design of Taiping town that is grid iron pattern creating traffic congestion and likely to get accidents because there are many junctions.
b. The location of urban form or land use pattern does not support walkability therefore forcing people to use private vehicle.

The failure to make use and plan transport using the "colonized" road pattern designed has contributed to traffic congestions in the town. The road pattern was not initially built for automobile but for security and sanitation. Hence, physical influences of road design by the British colonization can be found here indirectly. Secondly, the location of urban form is resulted from the land use pattern plan during British colonization. However, from the study of route favourability, factors contribute to route favourability are result of human behaviour and not colonization. The human behaviour

using the easiest route and fastest route reaching work place are influence by the nature of human avoiding crowd and waiting time. Whilst, crowd and waiting time are the results of the design of road pattern design during colonization period. Therefore, indirectly, there are influences of British town planning in human behaviour and the road users in Taiping town.

" I don't like to use the bus as waiting time is longer and the bus does not pass by my working place" *Respondent A*

"I like to use short cuts passing through the junctions as there are too many traffic lights and road blocks" *Respondent B*

6.9 Influences of colonization to road pattern and urban form

The modern Taiping town was planned suited to the nature of walking distance in addition to the safety and sanitation issue face by the British at that time (Maidin, 2012). Based on the information gather during the survey, we are able to relate the influence of colonization to road pattern and urban form to human behaviour in Taiping. The influence of colonization towards current land use and transportation problems in Taiping town can be explained into two separate components:

Component	Variables	Explanation
Physical	Transport	The grid iron pattern designed by the British are not suitable to the current transport characteristic contribute to congestions and accidents.
Non-Physical	Land uses	British influences can be seen in the context of its influence towards national land use pattern, urban forms, land uses system (hierarchy) and policy.

Table 6.6: The influence of colonization towards land use and transport in Taiping town

In summary, British colonization has influences to Taiping town land use and transportation problems through several factors that are economy, characteristics of education and political structures. Through primary analysis, this preliminary survey has found that the local authorities are constrained to development pressures and planning lead by national/state policy. In addition, political will in solving land use and transportation problems is not something can be changed by a single master plan. Even several master plans were proposed, the application of the planning needs to have stronger political will. Poor political determination in developing country may be a result of delay in independence period as maturity of society in focusing for better land use and transportation planning are lesser than economy development. The biased in political between urban planning over economy development may be result by colonization as there are needs for more development changes after colonization ended.

In colonized design town like Taiping town, town was designed **without** concerning rising motorization. The current land use pattern and urban form in the colonized design town hardly can be changed in a short term plan. But, continual balance of land use planning and integration of efficient public transport connecting land uses will reduce the dependability of road users to private vehicles. In summary, colonized design town should be designed carefully to maintain its originality of planning and suited to the unique town design and should not be blamed for the problems occur in the current land use and transportation problems. Alternative transport must be offered to people if we would like to reduce people dependability towards private automobile. Without alternative, people will force to use private automobile in any traffic condition, good or bad.

CHAPTER SEVEN
INTEGRATION OF LAND USE AND TRANSPORTATION SYSTEMS

7.0 Introduction

This chapter is to suggest improvement in land use and transportation problems in developing countries. The result analysis shows political and economy are main factor contributes to land use and transportation problems in developing countries. Therefore, an integrated system combining private automobile, public and non-motorized transport mode such as bicycle based on gradual stage of implementation in developing countries should be introduced. The step by step transport integration system is important as different developing countries encounters different land use and transportation problems vary to the unique characteristic of the developing countries itself. The gradual implementation allows specific problems solving by specific method.

One of the cost effective and easiest implementation alternative transport mode to reduce people dependency towards private vehicle is bicycle. According to Buehler and Pucher (2012), the levels of car ownership are not necessary incompatible with high level of cycling. Therefore, cycling is not recommended to replace automobile but it is an option of travelling mode especially within urban areas with intense traffic congestion. It is a good option for gradual transition from private vehicles dependency to daily use of public transportation as public transportation is difficult to provide by many developing countries due to economy constraint. According to Suzuki et. al (2013) there are two key initiatives to reversed automobile dependency that is shifting

travel from private motored vehicle to non-motorized and secondly is to promote transit oriented development with high quality public transit services.

Economy factor is a great influence to developing countries not only in developing land for development but as well as its influence to travelling pattern. Higher income countries are often associated with high percentage of car. Therefore, in both bad and good economy condition, developing countries come across problems to provide efficient transportation system. Ironically, according to analysis result of this research economy factor is not the only factor contribute to the bad or good of land use and transportation in developing countries. Hence, beside economy factor other factors must also take into consideration. If not, more focus will be given towards improving economy and problems will still continue. In highly economy developing country like China, the numbers of civil motor vehicles raise from 3.2 million in 1985 to 31.59 million in 2005. In contrast, developing countries like Bangladesh suffer from urban planning problem that is caused by government failure to control it (Sarma).

Clearly, land use and transportation problems in developing countries are influenced by many factors not subjected to economy. Therefore, focusing into improving economy in solving land use and transportation problems is not a good solution at all. According to Rodrigue, Comtois and Slack, the government are most involved in the policy making process and their role is vital in land use and transportation planning. Moreover, Iyer identified that the poorest 20 countries was also colonized. This is because, Tiwari stated that the transport and land use in the South Asia cities are different from the West. This is definitely true as the implementation of the English model of planning in developing countries are difficult due to the difference of problems between develop and developing country (McCoubrey, 2006). The nature

of development and transportation background is different from the Western countries. Therefore, recommendation to improve problems of land use and transportation must fit to the characteristic of developing countries itself.

Although there are progressively effort to make land use and transportation planning success, the high and unregulated growth of land use exceeded the limitation of traffic facility resulted failure in land use and transportation planning. Initial approach to use bicycle as alternative transport mode is an economical and easy apply alternative mode of transport compared to other mode of transport. It is less conflict with laws, land regulations, construction of new stations and self-support as developing countries mostly facing economy constraint to provide public transportation. Among benefits of bicycle is convenience, low cost, speed and it is environmental friendly. However, it also has disadvantages when used in an automobile road condition such as accident, weather, uncomfortable and not suitable for travel more bigger families.

Neither developed country nor developing countries are facing easy task in solving land use and transportation problem (Litman and Burwell, 2006). Additionally, developing countries are facing a great amount of automobile increase in the recent years (McMichael, 2000, Oman, 1994, Dargay et. al, 2007). As refute, increasing ownership of car is not necessarily means there is room to use automobile all the time in our daily lives. Automobile used can be control and car can be used intelligently according to needs. Therefore, there should be an alternative to automobile as transport mode to solve land use and transportation problems in developing countries. An integrated and gradual approach of alternative transport system is able to reduce dependency of people in developing countries solving the issue of land use and transportation problems.

7.1 Solving Land Use and Transportation Problems in Developing Countries

This research finds, colonization factor varies the factor contribute to land use and transportation problems. This is because different developing countries have different independence year hence influence stages of countries development. Colonization also influence difference land use and transportation system although not severe but different developing countries has different experience depends on colony invades them. Some developing countries face political interference in making up good policies, increased skilled workers and innovating research to improve land use and transport system. In another, there are some developing countries that have to face economy problems and as a result poor public transportation and lack of people commitment to land use and transport system. In instantaneous, both political and economy factor is important to improve land use and transportation planning. Therefore, an integrated strategy must be proposed consist the use of private, public and non-automobile transport mode as a good combination towards solving the problems of land use and transportation in developing countries.

The changes of urban land use pattern and travelling pattern from walkability to two dimensional systems that is expanded through automobile can be reversed. This can be done through gradually introducing integrated transport system consist of private, public and non-automobile transport mode in different land use condition and travelling needs. The main reason for the gradual strategy is because of various factors contribute to land use and transportation problems faces by developing countries. Therefore, public transportation is not the only solution to reduce traffic congestion but combing private, public and non-automobile transport mode such as bicycle are more flexible and

realistic depending to the needs and characteristics. Table 7.2 shows integrated strategy that can be used as alternative transport.

Table 7.1: Strategies of land use and transportation in introducing alternative transport

Land use Strategy	Transportation Strategy
Encourage development towards mixed land use pattern development	Increase parking fees during peak hour within town centre
Cycling route are planned based on effective land use pattern connectivity	Origin and destination is changed making daily travel shorter by cycling
Increasing density and controlling land development outside town	Integration of trio system that is private, public and non-automobile transport mode based on different land use pattern.

7.2 Recommendation for developing countries

This research found difference between land use and transportation problems among developing countries caused by colonization factor. Recommendations are made based on four common condition of several land use pattern in developing countries. In developing countries with town centre further than residential as result of urban sprawl, bicycle as alternative transport mode is difficult to apply.

In addition, new commercial centre developed in between changes travelling pattern. As town centre get denser, people move away from the centre and depends on private vehicles if poor public transportation is provided by the government. This is when traffic congestion occurred in many developing countries especially during peak hours. The land use pattern influence travelling pattern as town centre gets denser, new residential areas develop outside centre and people needs to travel every day. This developing countries condition is not able to use bicycle as alternative transport mode in the town centre due to huge distance between residential and centre. As an option, bicycle as alternative transport mode can be used within the residential itself and within the commercial centre if the location is within 3 kilometre considering types of traffic and also road hierarchy. However, public transportation is suggested to connect town

centre and residential areas located outside town centre. Table 7.3 shows several main land use condition in developing countries and recommendation to an integrated transport system considering different land use condition.

Table 7.2: showing several land use condition in developing countries

Developing Countries Condition	Recommendation
Condition A Residential and Town located less than 3 kilometres	Bicycle can be used as alternative transport mode from the residential area to town centre but restricted to road hierarchy that avoids heavy traffic.
Condition B Residential is located far, more than 3 kilometres but near to sub urban commercial centres	Although bicycle cannot be used as alternative transport mode from residential to town, it can still be used to nearby commercial centre. Public transport connect town centre and residential areas but limit the use of private within 3 kilometres.
Condition C Residential is located far from town centre and commercial centre. But recreation area is near to town.	It is difficult to encourage people to use bicycle if residential is far from commercial and town centre. However, if recreation park is near the town, bicycle lanes can be provided linking town and the park encouraging people to cycle. Integrated public and private vehicle connects districts and can be use ad medium to carry bicycle from one district to the other.
Condition D Residential is far from town and commercial area.	The location of residential as result of urban sprawl in developing countries discourages cycling as alternative transport mode. Therefore, new commercial centre or residential must think about linking both to encourage walking and cycling in future.

Land use condition of developing countries with town centre and residential located less than 3 kilometres is able to used bicycle as alternative transport mode. As automobile dependability increase travelling pattern changes, there are also residential further than town centre nearing industrial area as development grows. This area is constraint to apply bicycle as alternative transport mode restricted by heavy traffic and distance. Therefore, combination of public transport and private vehicles should be recommended. Figure 7.10 shows pictorial location four different land use condition in developing countries and suggestion of transportation integration between automobile and non-automobile mode.

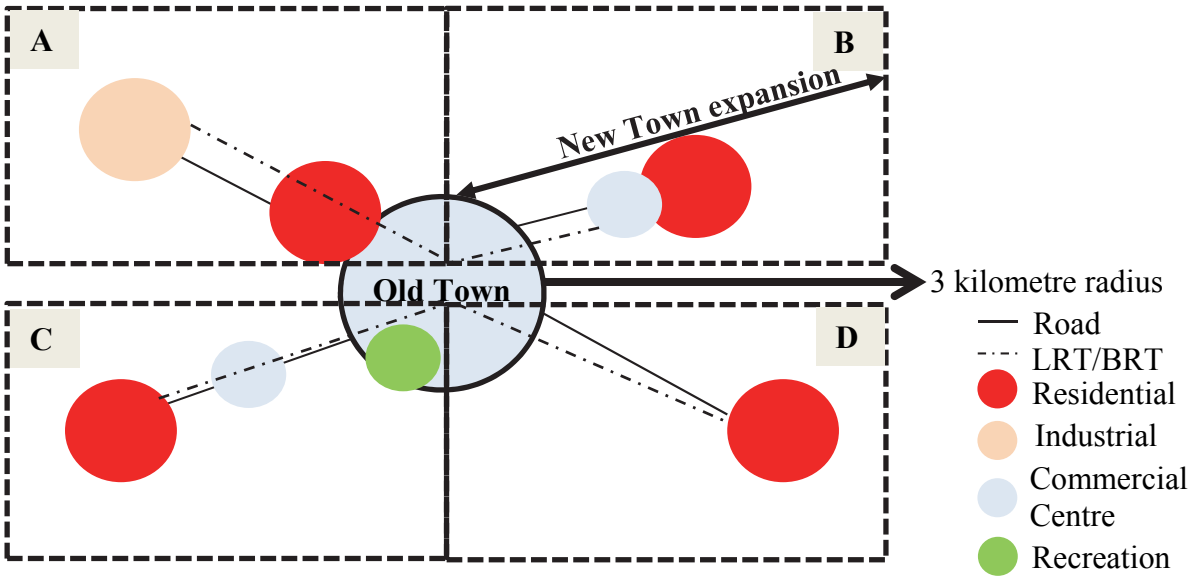


Figure 7.1: Different land use condition can apply several steps of transportation integration between automobile and non-automobile mode according to land uses.

In developing countries with residential is far from town, public transport can be used as mode of transporting bicycle such as using public bus and light way trains. Many develop countries applied this method by providing bicycle utilities in the public transport carrying bicycles from residential to recreation area and town area. It is possible to implement as early initiative to introduce bicycle as alternative transport

mode and nurture the awareness among developing country community the benefit of cycling. Developing countries with districts that are really far from town centre are connected by highways. As result of sprawl, residential is often found far from town centre. There is also no commercial centre nearby and people depend totally on private or maybe public transport to move from house to town centre for working and shopping. In this condition, it is difficult to recommend for bicycle as alternative transport mode. As a recommendation, future residential development should be proposed nearer to town centre.

7.3 Step by Step Integrated Transportation

Step by step integrated transportation system based on different land use condition is a recommendation to combine private, public transport and bicycle. Since, it is impossible to restrict the use of private vehicles due to the current land use condition that was shaped by automobile, it is important to integrate all kinds of automobile. Initial steps to reduce dependency of private vehicle are by introducing bicycle as alternative transport mode. As bicycle travel distance are limited compared to automobile, mixed land uses development will encourage more travel using bicycle. According to Jensen (2000), cycle routes and cycle networks are important to increase people using bicycle. The shorter distance between origin and destination allows more people to enjoy cycling as alternative transport mode including elderly and children. Another factor encouraging cycling is transit oriented development or TOD. TOD encourages cycling as TOD is compact and has mixed land use. In addition, public transportation used in TOD also allow longer journey using bicycle because it allows

connectivity between larger distance as most of roads in developing countries are currently shaped due to the high dependency towards automobile usage.

Another important aspect of mixed land uses is to encourage people cycle as the location of different land uses are near. This enables a reachable cycling destination in daily lives. The integration of land uses helps to increase the use of bicycle. According to Koike (2003), bicycle is most effective for short trip distance that is less than 5 kilometres. In addition, urban travel is most convenient as it is shorter than 5 kilometres. According to Wisconsin Bicycle Planning Guidance (2003), the average distance for cyclers is about 3.3 kilometres for social purposes but less used on working purposes because working trips is longer. This is due to the pattern of residential areas that is located outside urban areas far from working areas.

Towns develop before automobile increases tend to develop based on the grid iron pattern road. Develop in the early 1900 in many countries, grid iron pattern are more accessible and shorter distance for walking. In the case of applying bicycle as alternative transport mode, grid iron pattern road is suitable as shorter distance and accessibility between land uses allow better cycling route. In contrast, developing countries with roads shaped after automobile era tend to have more several characteristic. According to Marshall, the curvilinear loop pattern and the cul-de-sac pattern road are constructed to give more privacy and reduce the volume of vehicle passing by. In addition, the length of road shaped by automobile is also wide giving more priority to automobile movement instead of pedestrian or cycler. Therefore, combination of public transport and bicycle or walking should apply.

Public transportation such as buses and light railway transit is difficult to propose in developing countries with economy constraint. However, it is possible if

political factor in land use and transportation problems is reduced. As shown in the result analysis, economy factor is not the only factor contributes to land use and transportation hence it is logical to focus on other factor as well. Political is an important key for most developing countries to achieve success in land use and transportation. Political will encourage better policy making, increase in research and skilled workers. In developing countries with economy constraint, political factor drives motivation to improve land use and transportation problems with political support. Based on analysis result, the domination of political factor other than other factor to land use and transportation problems suggest its vital role in land use and transportation. In addition, the result shows a consistency of political factor in 2003, 2007 and 2011 compared to other factor shows political factor influences in land use and transportation problems.

However, it is not impossible to make integration between public transport and non-automobile transport mode. It is recommended that, bus system such as bus rapid transit to integrate districts with longer distance. This is supported by the improvement of political factor to implement such strategy. The success of bus rapid system can be improves with light railway transit along with economy stability of developing countries. As the light railway transits are more time efficient, environment friendly and sophisticated, the use of light railway transit will improve travelling pattern. Gradually, the dependency of people towards private vehicle will reduce and the government will need not to spend a huge budget. Most important is that, all developing countries are possible to implement such method.

However, in the current situation of developing countries cities that has already shaped by automobile, it is important to understand the current demand and supply. In a

study done by Nurdden et. al (2007), travel time, travel cost and car ownership are related to mode choice behaviour in Malaysia. The used of automobile are dependent to these factors due to the pattern of land uses because if the time of travel and cost is reduce there is likely chance to change to public transportation. In addition, Almselati et.al (2011) explained Malaysians prefer to use car due to degree of freedom, accessibility, passion for car and driving, comfort and perception to public transportation. Hence, it is explicit that integrated transport mode must be done considering condition of land uses. The initial strategy is to change the attitude of people minds using alternative transport.

7.3.1 Integrated Transport Mode in Case Study Town of Taiping, Malaysia

In the case of developing countries such as Malaysia, development and transportation are related to each other. The developments of the new corridor encouraging economy growth are linked through highways and roads. The used of bicycle after independence is decreasing as automobile dominates. It is uncommon to see people used bicycle to commute from house to working place as the distance is longer and also the tropical weather permits people from doing so. Hence, using bicycle as alternative transport within urban boundaries with radius of less than 3 kilometres allow cycling planning done before travel. Shorter distance also discourages people to depend on automobile and also help to protect the air from pollution. Obviously, mixed land uses pattern is important in recommending bicycle as alternative transport mode.

As a comparison between road patterns, Taiping town road was constructed by the British before automobile increase; the pattern resembles the grid iron pattern road. In contrast, the new residential area located at the sub urban of Taiping town

constructed after automobile increases. The layouts are different planned fitted to the needs and usage of automobile of Taiping town between two different situations.

Figure 7.2: Grid iron pattern road has shorter length with much road accessibility but may not necessarily be safe for bicycle. The new road pattern looking almost similar to grid iron pattern but with longer road length better for automobile but not suitable for walking or cycling

In the case of Taiping town, the town land use pattern was planned without considering the used of automobile as the main mode of transport during colonization of British. Therefore, in a colonized design town like Taiping, the recommendation of bicycle city planning is most suitable. The used of bicycle in different type of land uses not only reduce the dependency of people towards automobile but to encourage other needs such as shopping activity, social activity with friends and families and also health needs. Other types of public transport such as the bus and light railway can be introduce connecting sub urban areas when density increase and enough to support the needs of having public transportation. The integration of transport mode needs revitalization in political factor before other factor in land use and transportation problems can be solve.

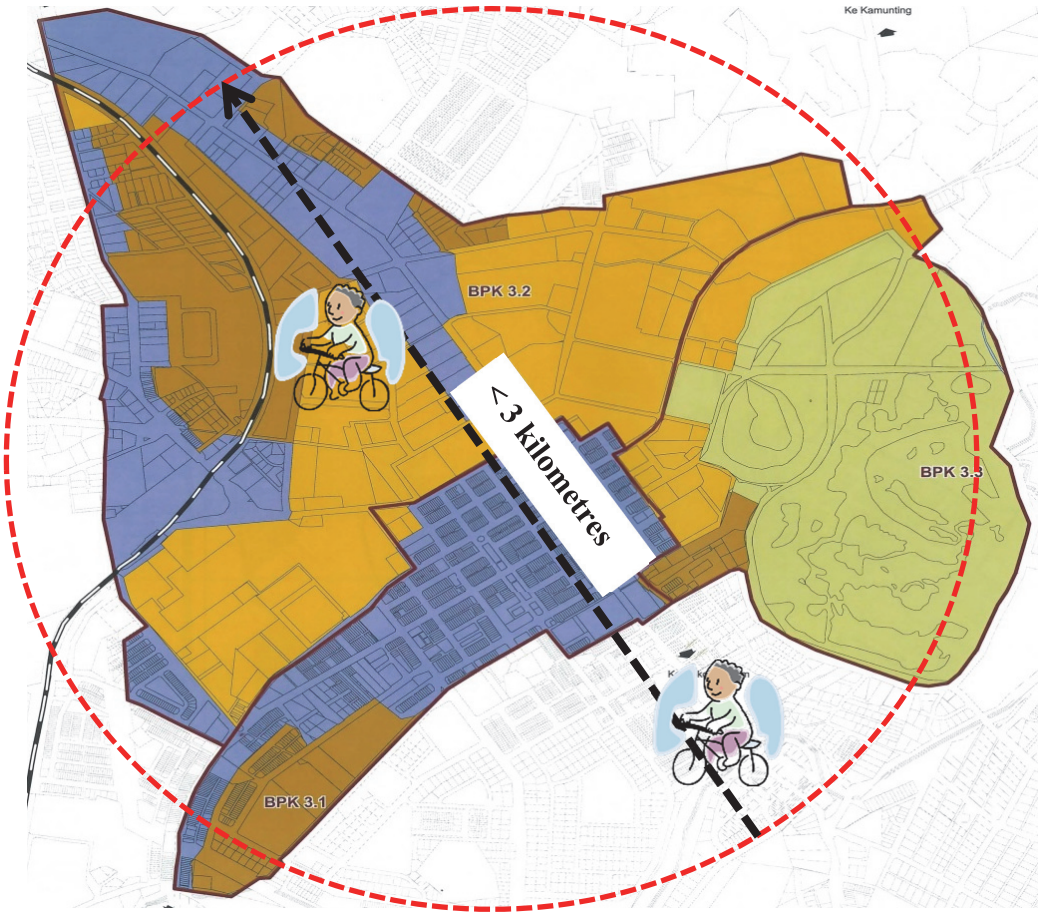


Figure 7.3: The radius of convenient bicycle as alternative transport mode in a mixed land use Taiping town

Therefore, recommendation to integrate alternative transport must consider development patterns existed of the city in developing countries. Factors that is important in urban movements and important to consider as suggested by Rodrigue et. al (2013) are:

a. Trip generation
b. Travel time
c. Trip assignment
d. Trip destination

In applying bicycle as alternative transport mode, these four factors must be studied. Firstly, bicycle must be able to accommodate people trips such as going to work, going to school and buying groceries. What kind of trip is suitable to be completed by bicycle? Secondly, travel time is an important factor to decide in planning over bicycle route. How far is residential to the nearest groceries? Can bicycle accommodate the needs of the people from house to shop? Is it too far from home?

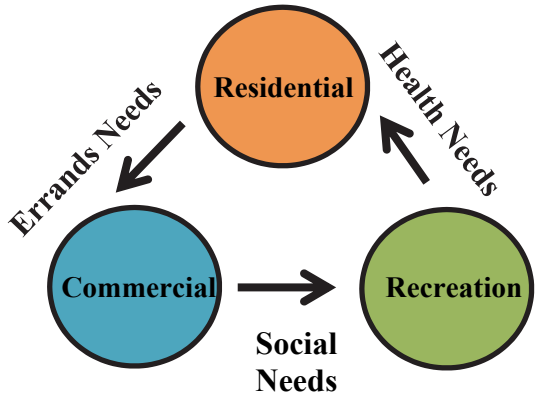


Figure 7.4: The triple use of bicycle within the town area for three types of land uses

Another solving method that is widely done by many develop countries is connecting and make use public transport through TOD. Public transport such as light railway train and buses are equipped with bicycle utility to carry bicycle from residential that is located further from urban areas. This encourages cyclers to use bicycle as they can make use public transport as connectors. In addition, China already has large cyclist population. According to Nanjing Transport Biro (2011), 38% of people living in Nanjing cycles while only 7% used private cars for travelling. Therefore, bicycle as alternative mode to automobile in certain developing countries is not a new story. In addition, the attitude of people towards cycling is highly correlated to the increase of bicycle utility as mode of transport. This is because, changing people

dependability from automobile to non-automobile mode is difficult as people considers convenient.

According to study by Koike et. al (2000) stated that people will change to bicycle when car parking becomes more difficult and car travel becomes more difficult. In relation to land use pattern, it is proven that the distance eventually important to encourage people using bicycle as daily mode of transport. The main criteria of land use pattern that should be met before applying bicycle as alternative transport mode is to have a mixed land use pattern that combines residential, commercial, offices, schools and recreation parks. This method is a gradual method that works as it is easy and economical to set up by the local authority. According to Buehler and Pucher (2012), although the number of car ownership are not compulsory to reduce along with high levels of cycling, many of high share cycling trips are for travelling to work or school.

However, cycling in a city congest with motorized automobile is far more dangerous. According to Wang and Jiang (2003), 70% of the road traffic accidents in China involved bicycle as China have the greatest number of bicycle in the world with 4.4 hundred billion bicycles. The numbers is high due to the collision involving bicycle and motorized automobile. Furthermore, Wang and Jiang (2003) found that the physical condition of the road that does not separated the bicycle and motorized automobile, safety precautions taken by bicyclist contribute to the high percentage of accidents among bicyclist.

7.3.2 Utsunomiya Strategy in Alternative Transportation Mode

Utsunomiya city located in Tochigi prefecture of Japan also encourages bicycle as alternative transport mode. The design of road hierarchy also includes the utility of bicycle. For example, road are paved and path are wide to benefit cyclers. In addition, bicycle parking are provided everywhere in the city. This eases the cyclers to park their bicycle at any destination. Cheap fee is applicable in parking areas with security cameras. Bollards and flower pots are used to zone area for bicycle.

Figure 7.5: Wide lanes for pedestrian and cyclers

Figure 7.6: Parking utilities complete with security cameras encourage safety and trust of people to leave their bicycle

Figure 7.7: Special lanes for bicycle on the road in Utsunomiya

According to Japan Ministry of Land, Infrastructure and Transport, bicycle lanes must be at least 1.0 meter. It can be extended between 1.0m to 1.5meter on the road. Pedestrian and cyclers should not share the same lane. Japan government effort to use bicycle as alternative transport can be found in many strategies implemented. According to Ministry of Land, Infrastructure and Transport of Japan, there are 98 areas that is now considered as Bicycle Friendly Model Areas. Recommendation is made using bicycle for distance up to 5 kilometres. The integration of private, public and bicycle in reducing dependency of private vehicles are the goal of Japan government. In addition, The National Association of City Transportation Officials (NACTO) suggests that bicycle lanes to be constructed exclusively following road hierarchy. NACTO suggest that recommended lane is 1.5 meter from the face of a curb. Besides that, coloured path and marking are used to specify area for bicycle exclusive lane. Among important elements of suitable cycling road condition consider safety, type of traffic volume and distance. In United States, the requirement varies around 1.5 meter to 2.0 meter depends on road hierarchy. Lanes also consider the traffic volume. Coloured road is always

recommended to specifically acknowledge cycle lanes. Standards of cycle should follow the needs and criteria of each country.

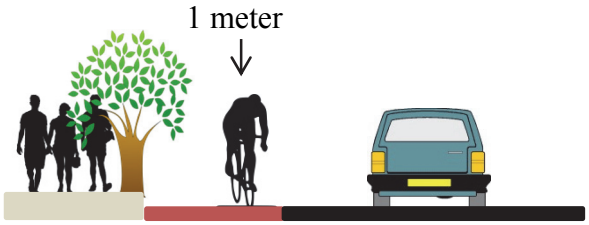


Figure 7.8: Cycling road standards used in Japan

Source: Ministry of Land, Infrastructure and Transport Japan

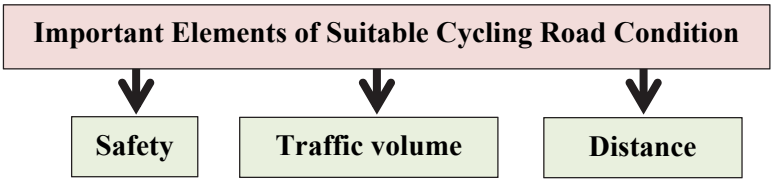


Figure 7.9: Elements of road condition that should be considered when proposing for bicycle as alternative transport mode

Light railway transit is another alternative transport mode that will be introduce in Utsunomiya. The construction of the light railway transit will reduce people dependability towards private vehicle. According to study made by Morimoto et. al (2006), the light railway transit will improve the traffic condition of Utsunomiya and encourage transit oriented development. However, the initiation of the light railway transit can be difficult due to problems such as law, anger from bus operators and also citizen attitude itself to change mode of daily transport. Hence, it is more important for developing countries to understand the current needs and condition of local community

before implementing any transportation strategy. Currently, Utsunomiya is one of model in promoting bicycle as alternative transport mode.

7.4 Bicycles as Initial Alternative Transport Mode

In 1986, the non-motorized share in Shanghai, China for bicycle is 31% compared to public transport with only 24% (Hook and Replogogle). In contrast, many countries still uses private automobile as daily travel mode and do not have an alternative to it. As a result automobile dependencies are severe. The utilization of bicycle in urban areas can help to reduce traffic congestions in cheapest way. In addition, the less involvement of policy and laws makes bicycle as good transport choice. Lanes are large and wide in distance between lands uses. The expansion of the road length indicated the massive development of roads connecting areas in India. The investment of the India government in road construction showed the important of the transportation expansion in India development particularly in expanding economy opportunities. In the case of China, the lack of cooperation and integration has contributed to the problems of transportation. In addition, the number of motor vehicle in China increases from 1.9 vehicles per 100 household in 1990 to 5.7 vehicles per 100 household n 2002 (Nogales, 2004). This has shown a tremendous development of automobile usage among Chinese. Bicycle and automobile movement is different as both served a different purpose of travelling. Bicycle could not carry more passengers other than the cycler themselves compared to automobile that is more convenient and able to carry more people at one time. This gives greater advantages to automobile if compared to bicycle.

Characteristic	Bicycle	Automobile
Distance	Short distance travel	Longer distance travel
Network connectivity	Mixed land use	Sprawl land use
Travel Cost	Cheap	Costly
Travel Time	Faster in shorter distance travel with heavy traffic congestions	Reliable in longer journey but takes time in heavy traffic
Space	Less space	More space

Table 7.3: Bicycle versus Automobile capabilities

People perception towards cycling is different between countries. According to Pucher and Dijikstra (2000), cycling is often used for recreation. Application of bicycle as alternative transport mode must consider many factors before the implementation. Among factors that must be considered are the land use pattern and type of road available to fit non-automobile transport mode in an automobile setting. This is because; most of the land use pattern and roads are shaped according to the use of automobile. In addition, there are many other factors associated to bicycle as alternative transport mode implementation such as political, safety, road condition, government policies, weather, health, social, culture, accessibility, trends and so on but this research focus into two important factors that create the foundation towards bicycle as alternative transport mode in developing countries. Suitable land use pattern and road suitability affects favourability and changes of mode from automobile setting to a non-motorized transport mode such as cycling are main factor encouraging bicycle usage.

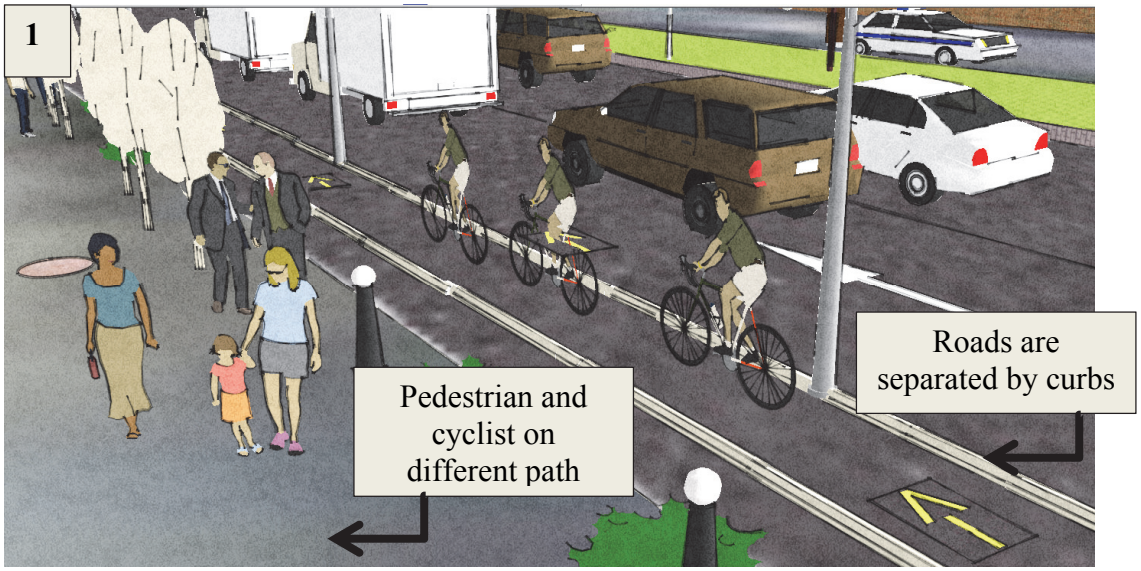


Figure 7.10: Recommendation for separate lanes for pedestrian, bicycles and automobile for safety purposes in developing countries

Recommendations are made based on study of several other develop countries successful program using bicycle as alternative transport mode. Besides those developing countries needs a cost efficient transport mode considering economy factors in the success of land use and transportation planning. In addition, the involvement of people in the system itself by encouraging people to use bicycle as alternative is another way to increase people awareness to the needs of controlling automobile in urban areas. So, local government can imply bicycle as alternative transport easily as it less involve with law, land acquisition and policy that needs approval of state or federal level. It can be treated as local planning initiatives to control the number of automobile in the urban areas itself. If new system such as buses or trams is introduced suddenly, there are worries that the numbers of people using these services are not encouraging.

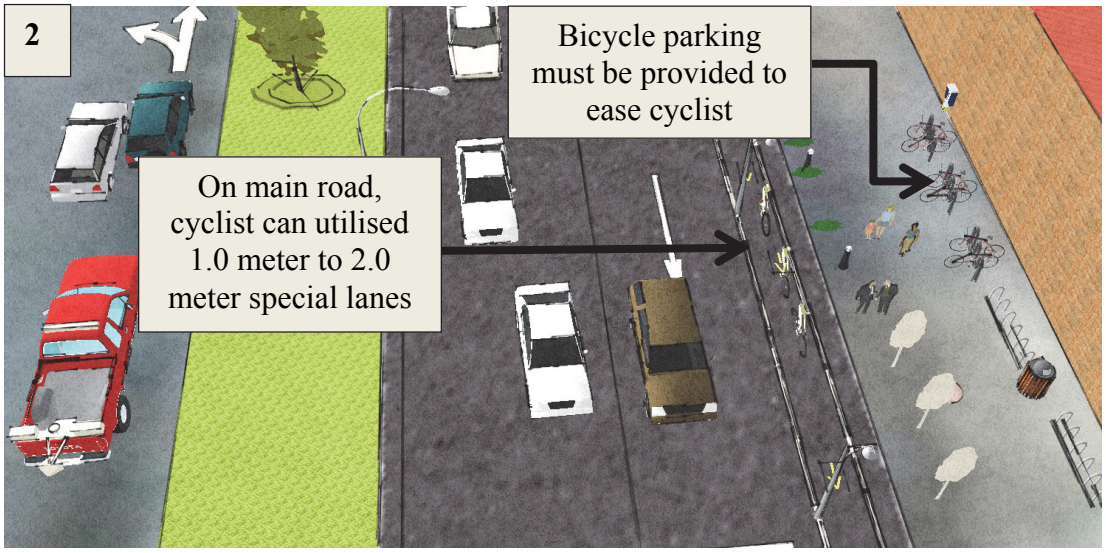


Figure 7.11: Recommendation for cycle lane width to be adjust according to road size and hierarchy of each developing countries

Figure 7.12: Special routes and lightings assist bicyclist to cycle during night time as improves the visibility.

7.5 Buses and Light Railway Transit as Alternative Transport Mode

The key to provide success integrate transport system are based on few indicators as suggest by Rodrigue et. al (2013). The indicators are transport time, reliability, punctuality and load factor. This indicator influence cost as well as the efficiency in the transportation system. Buses and Light Railway Transit are recommended as alternative transport mode to reduce dependability towards private

vehicle. The bus rapid transit is now common in several developing countries. It is not a surprise for developing countries to encourage people to use buses as alternative transport mode. However, the poor implementation of bus system is the main problems in many developing countries. Route networking connecting origin and destination is one of important points to a success bus system. It is much related to the density of population influencing occupancy of a bus route. Sprawl with low density discourage success bus route system as it acquires longer distance for buses for maximum passengers per destination. Hence, compact cities are highly associated with success of public transportation system due to its high density.

Figure 7.13: Reduce private cars dependability by introducing public bus system together with bicycle as alternative transport mode.

As starting, developing countries can apply public bus that does not run on dedicated lanes. The bus route can still be change when one route is not a success. In addition, the flexibility of normal public bus allows buses to relocate bus stops based on highest occupancy and dedicated stations. In addition, time management and accuracy is also important point in delivering success public transportation system.

Since public transport relies much on supply and demand, it is important to understand and create an efficient bus system. The failure of bus system to operate on time will decrease people favourability towards bus system. The poor time management and accuracy discourage people dependency on bus system as it is not reliable. Therefore, knowledge and skill of bus driver to properly plan their journey is important. This relies on the shoulder of the government to provide efficient bus system.

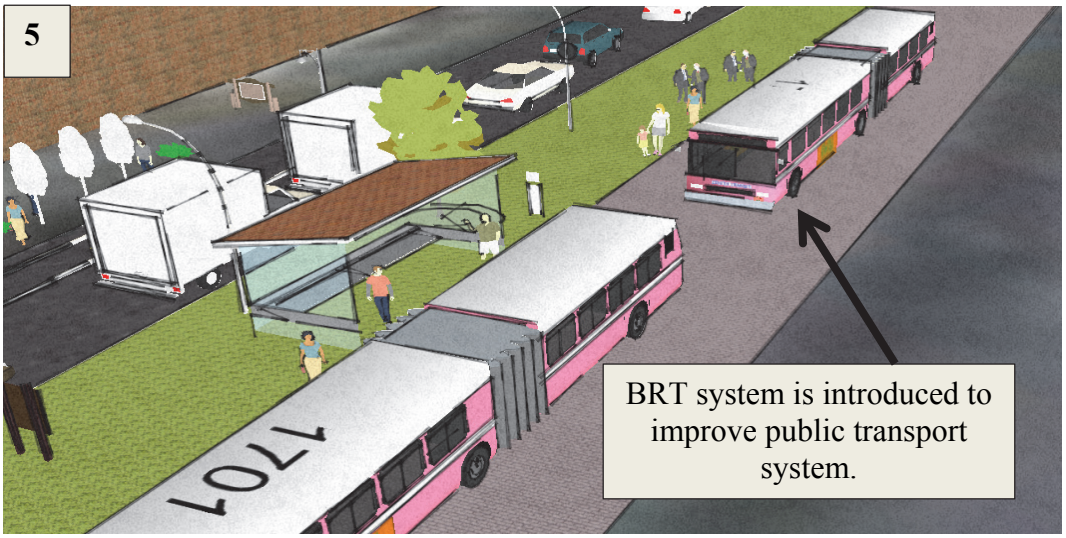


Figure 7.14: As economy improves, BRT system can be introduce with special lanes dedicated for BRT.

Bus rapid transit system that runs on dedicated lanes is another level of public transport that is suitable in many developing countries. Dedicated lanes means buses can run without interfering with other transport modes such as motorcycles and cars. The system is more smooth and manageable. The application of the bus rapid transit system is successful in Curitiba, Brazil. According to Suzuki et. al (2013), the success of the integrated system is based on the policy that benefits people rather than cars. The "Trinary Road System" that combines bus dedicated lanes and two way roads for cars connect high density areas. The high density consists of commercial, business and residential land uses are the key to the success bus system in Curitiba. In addition, as

proven in this research, Curitiba success in integrated bus system also relies on the political will to gain success in land use and transportation system through integration transportation system.

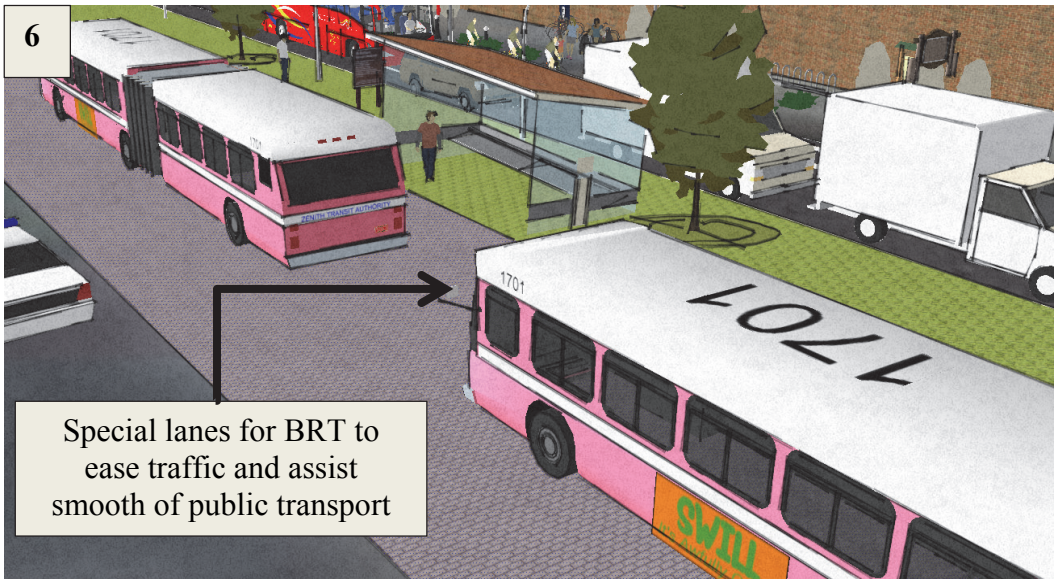


Figure 7.15: BRT system is proven success in Curitiba connecting land use with low and medium salary group to city area reducing the needs of using private vehicles to city.

In terms of economy, developing light railway transit is more expensive than preparing for bus rapid transit system. However, in the modern days, the light railway transit is more preferable by many. This is because of the sophisticated look, environmental friendly and it is more efficient than bus system. The light railway transit is an innovation of tram system or streetcars that is well known in many developed countries. The light railway transit uses electrical power that runs on dedicated lanes or elevated lanes like the bus rapid transit system. Compared to the normal rail system, the light railway system can have more stops and this is more effective to connect between districts. It is seen as more efficient public transport system compared to bus rapid transit system but better.

Despite of the efficient light railway transit system, the cost of preparing the system are higher than bus rapid transit system. In many developing countries, government budget to prepare for public transportation often clashes to the other needs of the country. The focus however is result of development and attention towards increasing economy growth. It is cliché that many developing countries is unable to provide efficient public transportation system align to the increase of economy growth. The imbalance between land development and providing sufficient transportation system are the cause of many urban problems in developing countries. In the end, the poor planning that includes poor political will plans for efficient transportation system that is pro private automobile. Again, political will of developing countries to provide efficient public transport system is crucial. Although economy is the aim of many developing countries, it is often seen as a burden for the government to spend on public transportation cost. The operation cost not only inclusive of constructing the initial system but also running operation cost. Therefore, it is important to have a high density population to ensure high rate of occupancy of the public transport system. The running operation cost includes time, distance and frequency of public transportation system.

Like the bus rapid transit system, the light railway transit system must consider distance and accessibility to create effective route. This includes connecting route between high density districts. A solution, bus rapid transit system can be improved to light railway transit system using the same dedicated lanes. The improvement of system allows planner to use the same lanes and route network but with improvement of speed and more efficient system of travelling. This will also saves cost of billions as there is no need of studying new networks instead only improving.

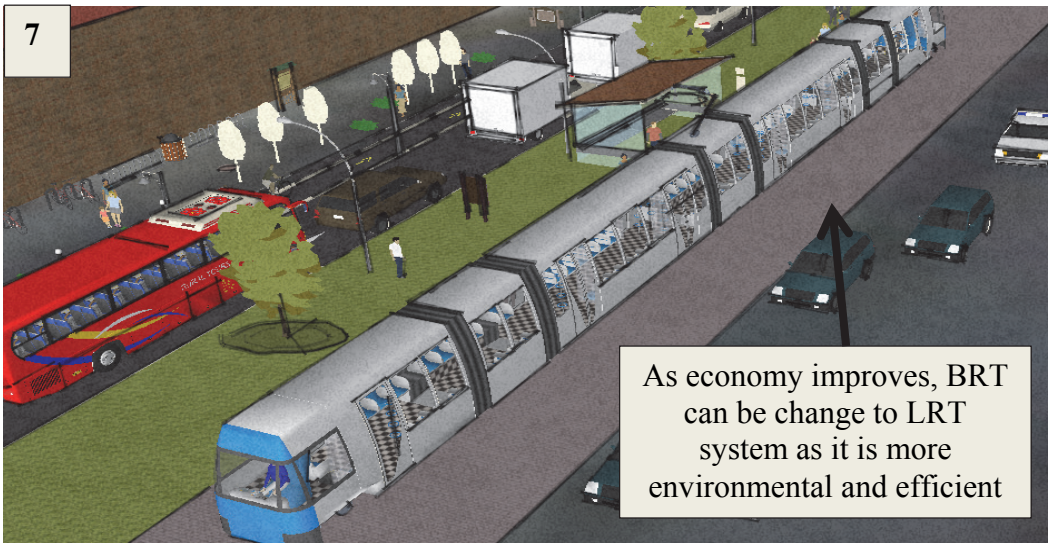


Figure 7.16: Gradually, BRT system can be replace by LRT system as economy gets better because LRT system are more environmental friendly and efficient. Same lanes can be utilised replacing BRT to LRT system.

Figure 7.17: On the road LRT system able to connect with surrounding land uses and it is more convenient for people to use.

In summary, the recommendation for integration of transportation system considers important points that are:

a. Achieving balance through gradual integrated transportation system consisting public transport, private automobile and non-automobile based on the condition land use pattern.
b. Achieving balance through the concept of demand and supply through efficient route networking considering population density and dedicated route.
c. Reduced dependency of private vehicles by introducing alternative transportation mode gradually but consistently with strong government political will.
d. Reduced focus on economy factor instead focusing into other factors such as political, knowledge improvement, skills development and improvement in public transportation.

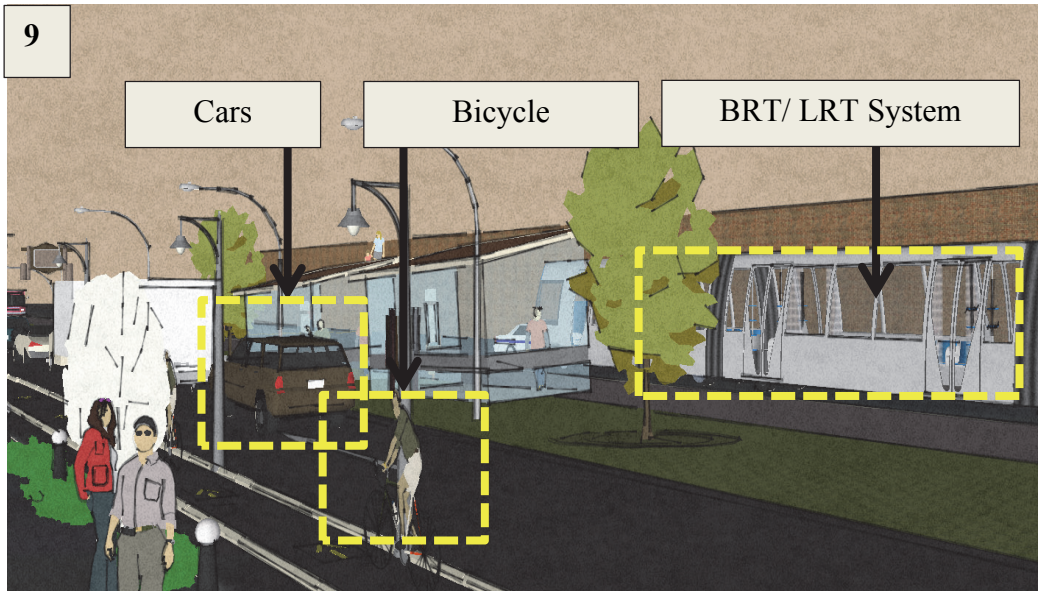


Figure 7.18: The three dimension integrated transport system consist of public transport, private vehicle and bicycle are effective and able to reduce traffic congestions problems in developing countries.

CHAPTER EIGHT
CONCLUSION OF RESEARCH

8.0 Findings of Study

There is no definite line to determine what is wrong and what is right based on history because history will remains as history. Urban history is an important research area as the cause and effect of any previous action to the current situation. In particular, this research finds the influence of foreign urban planning and systems in undeliberated land use and transportation problems of unstable developing countries condition. There is difficulty to find precise standard guidelines or academic reference made to justify the influence of colonization towards land use and transportation problems. This research fills in the gap where most researchers wonder if colonization ever plays a role in the current land use and transportation problems in developing countries. The connection refers to the "colonization" it as planning was not made to suit current local perspective but to comprehend to the needs of colonizer.

Planning must be tailored locally. The main result of this research is there are many reasons contributed to land use and transportation problems in developing countries but economy and political factor are the highest reason. Then, comparison is made between developing countries to clarify colonization is significant. A developing country that was still colonized after World War 2 is constrained to colonial planning influences in its land use and transportation problem. While non-colonized developing countries also agonize by land use and transportation problems but they are not attached to the consequences of colonial. What are the colonial influences? Based on the further

study made at Taiping town in Malaysia found that British colonial influence in the land use planning law, land use planning of the town which is based on social segregation and grid iron road design which is not suitable to current transportation condition. As, many colonizers are also developed country today, many researchers found that developed country planning style is not suitable to developing country condition.

Developing countries are commonly defined by economy, social, education and infrastructure level. Hence, economy became the main focus of achievement to upgrade all sectors in the country. Many developing countries also suffer by post-war and colonization affects making them different from develop country where generally they are the colony. Planning over a country with social and political issues, economy deficiency are difficult as the goal of developing country are different from develop country. Similar to Japan development in 1970's, the issue of motorization alert the Japan government to plan over the transportation system. This is similar transportation situation in most developing countries now. A compact and high density city encourages the development and usage of public transport. The expansion of urban areas from one dimensional to two dimensions increases urban boundaries confirming the dependability to automobile. It takes many years, experiences, lessons and skill to reach excellent system. Each developing country is different in history, culture, religion, population and history. It cannot be denied that history and the background of a country shapes a country development.

In order to understand the reason of land use and transportation problems in developing countries, questionnaires are piloted to find the reasons. Based on the findings, there are 10 main factors contributed to land use and transportation problems in developing countries. There are economy, political, lacks of cooperation, law

problems, lack of education among people, lack of information, lack of talent, unconcern of people, difficulty of policy implementation and lack of public transport. Using Factor Analyses, results are interpreted into meaningful and significant group to understand the pattern of result. Analysis result shows political factor is higher in developing countries that were once colonized by foreign colony. As colonization affected the government and administration system, political factor is often broken up. Analysis shows in non-colonized developing countries, economy, people characteristics such as knowledge, talent, skills and information are more influential in land use and transportation problems.

In comparison, economy influences common factor like lack of public transport, lack of information, difficult policy implementation and unconcern people. Improvement of economy not necessary will solve problems as political factor can influence land use and transportation problems. The demand in urban activity and traffic activity but poor in facility resulted failure in planning. Result analysis shows that there are differences of word frequency result given by our respondents before and after the world economy crisis in 2007. Independence is accountable for differences in the word links in factors of failure in land use and transportation planning. There is a higher degree of centrality index which means more complex ties (links) of nodes in developing countries with less than 65 years of independence. The differences of each factor are not the same in each developing country. For example, the lack of knowledge in developing countries less than 65 years of independence seems more associated with people. This describes, more time is needed to educate the people about the important of land use and transportation planning.

Each and every single developing country is unique and should not be levelled or put into hierarchy based on economy factors only. **Government involvement** in land use and transportation planning must not be biased towards economy growth only but to improve the livelihood of the community. Developing countries must **increase public participation** as to increase the awareness of the public towards the importance of land use and transportation planning. This will also ease government strategies by increasing knowledgeable community. The **number of skill and knowledgeable** professional involved in the policy making especially in the government should be enlarged. The cooperation between urban planning sector and transportation sector should be accordingly formed as to integrate balance in the planning.

In colonized design town like Taiping town, town was designed without concerning rising motorization. The current land use pattern and urban form in the colonized design town are hardly can be changed in a short term plan. But, continual balance of land use planning and integration of efficient public transport connecting land uses will reduce the dependability of road users to private vehicles. Different developing countries have different factors disturbing land use and transportation planning and needs to avoid conflicting of planning before and after colonization. The different system and approach before and after colonization influence problems of land use and transport in developing countries. Some developing countries that are colonized are still tied up and shadowed by the colonization system. Therefore, **strong political will** to create efficient policy and applying land use and transport integration is crucial. The success of land use and transportation planning relies on the balance between all the factors. In order to find the meeting point and ensure the success, progressive baby steps is important. Developing countries need to take chances and not afraid to do mistakes.

Undoubtedly, strong political supported by economy factor is important. Approving to Newman and Kenworthy (1996), the political power is vital to offer well planned urban area and runway from the typical Western style that is not adequate to the setting of many Asia cities. This research concludes that there are variations of land use and transportation problems condition among developing countries and colonization factor is one of influential factor. The variations affect the kind of strategy and methods of solving land use and transportation problems in developing countries.

8.1 Possible Application of Research

From this research, there is further understanding on the variation of developing countries land use and transportation problems. Analyses result indicates land use and transportation problems can be different between countries based on the colonization factor. This is because colonization effects development phase and the systems applied in its land use and transport. Apart from that, the inheritance of system or the effects of land use and transport planned during colonization can influence current land use and transportation problems as it was not originally planned to fit the current problems of automobile in most developing countries.

The main possible application of this research is towards method of solving land use and transportation problems. Different developing countries should use different strategy to solve land use and transportation problems. Although many developing countries struggle in economy, land use and transportation problems can be settled as there are many other factors besides economy found in this research contributes to land use and transportation problems. By knowing this factor in this research, it is possible to suggest methods to solve land use and transportation problems in developing countries.

There are limitation of this research due to time, budget and difficulty of reaching and attainment of data. Collecting data from many developing countries can be a tedious task but this research was made possible through JICA workshop program conducted every year in Japan. The first limitation was to choose respondents for this research. Although that all respondents are professionals in their field and most involved in urban planning of their country, the number of respondents, year of experience and other characteristic of respondent could not be decide. As all respondents come to Japan by themselves to attend the JICA workshop, the extensity of this data only reaches to the group only. Second limitation is to reach data in other developing country besides Malaysia due to lack of communication and other difficulties. Therefore, the respondents comments made during the program are the only data attained and analysed to understand about land use and transportation problems in their country. In order to solve this problem, secondary data such as master plan, academic research and also journals related are used extensively. Lastly, this research could only focus on British colonization as major of respondents country is colonized by the British. It is possible in future, to compare the influence of different colonizer towards land use and transportation problems.

8.2 Future Works

There are rooms of improvement in this research. This research compares developing countries land use and transportation problems between colonized and non-colonized developing countries. Throughout conducting this research, it is found that there different types of planning methods applied by the colony. Therefore, future works can study in detail of each colony planning style onto their colonized territory. British

and Spain for example has different interest towards its colonized territory. Detail comparison between different colony will provided better understanding towards land use and transportation field.

Secondly, future works can be conducted towards understanding colonization influences towards different country. Due to the limitation of data and resources, this research could only study Malaysia as one of colonized developing country as case study. Instead, in future research can be done to understand other developing country effects as result of colonization including developing countries effects of non-colonized. Lastly, it is recommended that detail research of each land use and transportation problems in different developing countries. Political problems in India for example might be different from political problems in China in relation to land use and transportation planning. Hence, better understanding will provide more valuable knowledge to problems of land use and transportation as it is well defined in this research that there are variations of developing countries land use and transportation problems.

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