

**THE INFLUENCE OF DECENTRALIZATION AND INSTITUTIONAL
STRATEGY ON ROAD NETWORK TO PROMOTE THE SUSTAINABLE
MOBILITY REALIZATION**

**(CASE STUDY : BOGOR-CIAWI-SUKABUMI ROAD NETWORK,
INDONESIA)**

THESIS

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ABSTRACT

THE INFLUENCE OF DECENTRALIZATION AND INSTITUTIONAL STRATEGY ON ROAD NETWORK TO PROMOTE THE SUSTAINABLE MOBILITY REALIZATION (CASE STUDY : BOGOR-CIAWI-SUKABUMI ROAD NETWORK, INDONESIA)

Development of governance system has emerged the transformation in governance system in Indonesia, from centralization towards decentralization system. Decentralization system has changed fiscal, administrative, and policy procedure. This system opens public participation, but also contributes the negative effect of fragmentation and self development in transport and land use planning.

This thesis analyses the physical failures which were measured by sustainable mobility indicators and integration degree of land use and transport system. Analysis result shows that decentralization has its failures and made the physical failures that are perceived by road users.

In the end of the thesis analysis, several institutional strategies were promoted to realize sustainable mobility in BOCIMI area. Those institutional strategies are based on the failures that have found in preceding analysis. Collaborative approach dimension are used as the foundation of strategy, which are collaborated with physical strategies, regarding with land use and transport integration.

Key Words : *Decentralization, Sustainable Mobility, Integration Land Use and Transport Planning, Collaboration Approach*

ACKNOWLEDGEMENTS

“ This thesis is dedicated for my mother, Mrs. Wawah Wahyuningsih ”

When I started to work in transport’s governmental institution, I considered that decentralization system emerged the difficulty of coordination and communication between each government level. Various interest, political jurisdiction and fiscal matters became the main issues in this difficulty. Several policies just concern on technical matters and based on technical analysis. Fortunately, I have an opportunity to take master degree in Bandung Technology Institute that led me to technical understanding and University of Groningen that led me to understand the importance of communicative rationality in policy making. This thesis tries to found the red thread between technical rationality that I got in ITB and communicative rationality that I got in RuG.

Firstly, my grateful for Allah SWT, so I have the meaningful time in learning process and finish my master thesis in time. I would like to address my greating thanks to my supervisor, Mr. Niels Heeres, MSc (RuG) for understanding, giving me the constructive advice to improve my thesis, including my english ability. I also like to address my truly thanks to my second supervisor, Dr. Miming Miharja (ITB) for the advice to complete this thesis. Proposal arrangement is one of important steps in this research, I would like to say thank you for Mr. Justin Beaumont and Mr. Taede Tillema who help me to build the beginning idea. Furthermore, I would like to say thank you for Mr Johan Woltjer and Mr.Heru Purboyo as double degree coordinator; Mr. Sugihardjo, Msi (Director of Road Traffic and Land Transportation) who always gives me the support to continue this struggle; the survey participants : Head of Transport Agency of West Java Province, Mr.Soebiantoro (Head of Transport Agency Kabupaten Bogor), Mr. Wimpy Santosa (Non-Governmental Representation), and Mr.Mochammad Bimo (Transport Director in AQUA Golden Missisipi, Co).

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Chapter 1

Introduction

This introduction chapter provides a brief explanation about the research; consists of a background, aim, research questions and the structure of this thesis. This chapter explains the necessary of research about decentralization influence in order sustainable mobility realization in Bogor, Ciawi, and Sukabumi (BOCIMI) road network.

1.1 Background

This section will explain the beginning understanding about sustainable mobility concept, the importance of land use and transport integration, and the influence of governance system to sustainable mobility realization. Furthermore, this section also explains the importance and the main reason of this research.

1.1.1 Transport and Land Use as a System to Promote the Sustainable Mobility Realization

Transportation is one of strategic sector for the cities, regions, and countries. Besides important as a supporting matter in economic development, transportation also relates with social behaviour and environmental issue. Transportation can be seen as multidimensional sector, because of that many researchers analysed transportation from various perspectives. Black (2004) explored transport geography that related with transport facilities location and traffic demand. Munnell (1992) and Button (2004) analysed transport from economic perspective, they specified the importance of infrastructure development in transport field for economic development. Noland & Lem (2002) elaborated the influence of transport system changed to environmental policy development. Their research led more development in transport analysis relates with environmental perspective.

Transport system can be interpreted as network which is related with each other, and requires the synergy interaction between the other systems. One of those systems is land use system. Transport and land use are two sectors that can't

be analysed as two separated system. On one hand, activities and network will provide transport system; on the other hand network and transportation will generate more activity in the land use system (Kusbiantoro, 1994). His statement was reinforced quantitatively by Waddel et al (2007) who explored about the linkage between land use and transport through model estimation and sensitivity analysis, the result showed that the effects of transportation system changes on land use, and the consequent it emerges feedback effects on transport system performance.

Integration between land use and transport system can influence the easiness to getting destinations. There are many researchs about the importance of land use and transport integration. This integration analysis generated the emergence of “Sustainable Mobility” concept by Banister (2008). This approach strengthens the importance of transport and land use system integration, because its realization can increase the road performance by: reduce the need to travel, stimulate modal shift, reduce trip lengths and increase efficiency in transport system. The increasing of road network performance influences the balancing of environment, social, and economic development. Unfortunately, in the fact it’s not easy to realize the integrated planning between land use and transport. Government system, culture, climate, differences of interests and economic factor can be the main factors which are lead lack of integration between land use and transport planning was happened.

1.1.2 The Influence of Governance System in Sustainable Mobility Realization

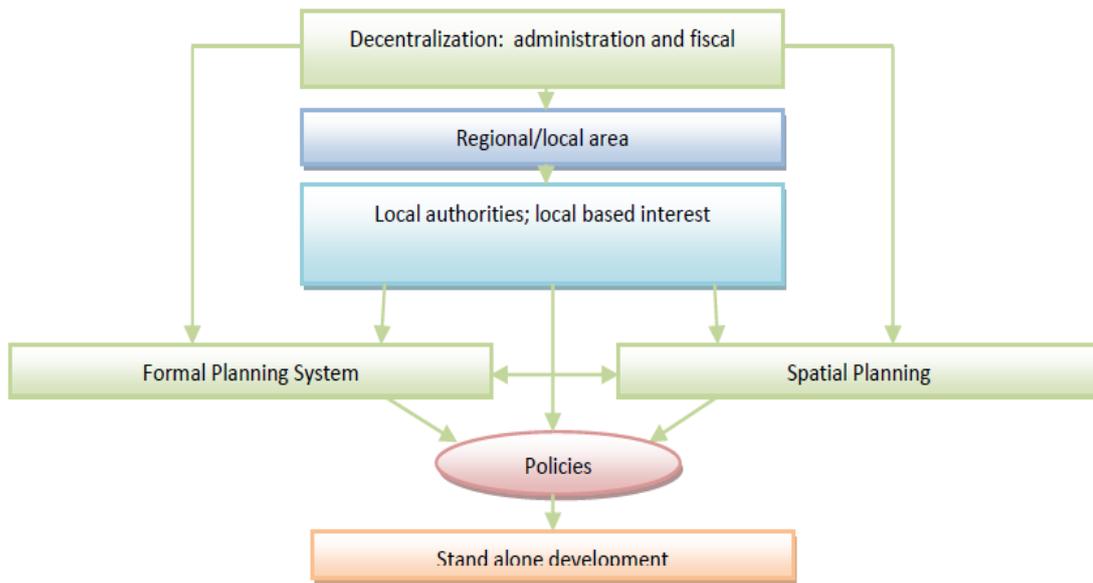
As the explanation before, the failures of sustainable mobility realization, including the integration between land use and transport system, are influenced by many factors, one of them is government and institutional system.

To strengthen this statement, Kusbiantoro (1994) described that institutional system can influence the interaction between land use and transport system. As the influential relationship between land use, transport, and sustainable mobility, it means that government have an important role to organize the synergy between land use and transport system to provide “sustainable mobility”. The other

research by Heeres et al (2012) elaborated transport and land use integration changing in Dutch planning from “line” towards “area oriented” approaches. One of their explanations shows that organizational changing from government perspective to governance also influences the integration between infrastructure development and spatial planning. This research result can be a consideration, when we realized that infrastructure development as one of pillar for sustainable transport manifestation (Kennedy et al, 2006).

The institutional issue evolved rapidly since many countries, including Indonesia. They changed the government system from centralization to decentralization. This change relates with Heeres’s (2012) analysis, about the shifting perspective from government towards governance. These perspective turn also contributes the complexity increasing in planning arena. In the other words, centralization with its top-down system has changed become decentralization with bottom-up system. As the consequence, horizontal network has increased and more actors from multilevel governance, both government and the other institutions. Finally, the degree of complexity in planning arena also increased.

The increasing of complexity degree is also explained by Bherta (2009). He argued that decentralization as one realization of governance perspective emerges its local autonomy stated in administration and fiscal policy resulting on discretionary and devolution in regional development, local egocentric, unbalanced growth between indigent and prosperous region. This condition also contributes the increasing of complexity degree in planning system.



Picture 1.1 Decentralization-Formal Planning System-Spatial Plan with Implication to Stand Alone Development

Source : Bertha, 2009

Each local authority led local based interest emergence, and it makes different policies in planning system, finally it makes “stand alone” infrastructure development in each local government (**picture 1.1**), whereas as we have known that transportation can’t be bounded by territorial boundaries (Pemberton, 2000). This explanation fits with Harvey’s (1989) statement about entrepreneurialism, as a result of decentralization system, that makes each region have to develop their region with each resource, and the region become capitalism (Harvey, 2008). Various investor in various field emerged. This condition will make the development between region becomes unbalanced. Regions that have rich resources will be easier to develop their region. Otherwise, the poor regions will be more difficult to develop their region.

1.1.3 The Importance and the Difficulty of Sustainable Mobility Realization on BOCIMI (Bogor-Ciawi-Sukabumi) Road Network

Bogor, Ciawi, and Sukabumi are the buffering cities of Jakarta, as the capital city of Indonesia. As we have known, that Jakarta is the busiest city in Indonesia with high activity density. Because of that, those three buffering cities have

important role to support the main activities in their own city and in Jakarta. As the strategic cities; Bogor, Ciawi and Sukabumi should be equipped with organized land use and integrated road network.

As the explanation in last report (Novianingsih, 2013) about scaling policy in BOCIMI area, BOCIMI is an artery national road, so that, it should be no heavy land use activity besides the road network (regulated by Indonesia government's act number 38, 2007 about Road Hierarchy in Indonesia). But since decentralization era with separated jurisdiction in land use and transport development between national, provincial, and local government, Bogor and Sukabumi has each right to develop each part of BOCIMI. As the consequence, the economic activities were emerged beside the road networks: high industry, commercial areas, and the others. The function of BOCIMI has changed, not only as the trunk line, but also as the begin origin and the end destination of journey. Consequently, in line with amazing of vehicle growth, the performance of road network was decreased. In 1998, volume capacity ratio (v/c ratio) on peak hours is 0,48 (Transportation Ministry, 1998), in 2012 becomes 0,82, and average speed on the network only 29,4 km/hour, with level of service "D" (Aqua Golden Missisipi Co, 2012). It means that all of the driver couldn't free to choose their journey speed; delay and stagnation occurs on the road network.

There are many impacts of that condition that perceived by various stakeholders; including government, investor, and the society. Those impacts relate with sustainable concept that consists of environment, economic, and social concern. BOCIMI area becomes a dirty area with high pollution and filled with private vehicles and freight vehicles. Consequently, the trips on BOCIMI road network are really costly, both for industry communities and the society. This condition becomes a big challenge for national government as a stakeholder who responsible in road network performance, and local government who responsible in land use implementation.

Based on explanation above, we consider that there are many stakeholders who are related in this problem. In BOCIMI case, not only national government and municipality who have interests but also investor and the society. Each stakeholder has different interest and background of knowledge. Finally, the

complexity in this case has risen. For this condition, the main challenge for planner is combine all of the interest with different policy and regulation become one integrated planning which is support “sustainable mobility” objectification.

1.1.4 Collaborative Approach as the Strategy

To cope with complexity problem, Healey (1998) suggested collaborative planning approach which stress on open network and local capacities. The change paradigm from “government” to “governance” could be a way to open the link between the government, investor, industry community, municipality, and the society. Further, Lenferink et al (2008) explained that planning process must be more flexible with respect to involving other actors into the planning process, it could be realized by collaborative planning, open, participate planning, and strategic partnership approach. Participation, uncertainty, normativity make the planning become a complex problem. In a row of communicative approach development, the next challenge for the planner is to find the strategic and simpler way for communicate and combine all perspective.

1.1.5 The Importance of Research

Derived from condition and theory above, it becomes important to develop a research about the influence of decentralization system in inter-subjective perspective from institutional side to road network performance that can be related with physical failures. Furthermore, it is also necessary to develop the institutional strategy to realize sustainable mobility based on correlation lacking between decentralization and physical system.

To make this research more concrete, some assumptions are taken for this thesis. They relate with the changed of institutional system for BOCIMI road network and its implication, existing road network performance based on sustainable mobility indicator, and the strategy to solve the institutional problem in order sustainable mobility realization.

First, decentralization system in Indonesia has influenced BOCIMI’s road network performance. Disintegration between land use and transport planning, authority, and regulation makes degradation performance of BOCIMI road

network; which are measured by sustainable mobility indicators. The second assumption relates with strategy in institutional setting. Collaborative approach could be an essential egression for decentralization lacking to achieve sustainable mobility. Accordingly, this thesis refers to the explanation how decentralization system can influence the land use and transport system integration in BOCIMI road network in order to reach sustainable mobility.

1.2 Aims

This thesis aims to analyse the implications of decentralization failures for disintegration between land use and transport planning. This disintegration failures cause the degradation of BOCIMI road network performance which is described by sustainable mobility indicators.. The result of implications analysis can be used to arrange some institutional strategies to promote the achievement of sustainable mobility.

1.3 Problem Statement

From the background above, the problem is located to the direction of decentralization policy that caused lacking of land use and road network policy integration. It follows by the “stand alone development” system in each policy, authority, investment regulation and occupant’s interest. Further, this condition influences BOCIMI network performance and disintegration policy between land use and transport system, so that really hard to reach sustainable mobility in transport sector. Consequently, it must be searched some institutional setting strategies to improve BOCIMI road network performance.

1.4 Research Questions

Based on the aims in linkage between decentralization, institutional setting, and road network performance in BOCIMI relates with sustainable mobility concept, there are some **main research questions** will be answered:

1. How is BOCIMI existing road network performance based on sustainable mobility indicators, including its integration with land use pattern?

2. What are the implications of decentralization system for the integration planning between land use and transport system in BOCIMI and its road network performance regarding sustainable mobility indicators?
3. What is better institutional strategy to support the improvement of BOCIMI road network in order sustainable mobility realization?

The first and the second questions will be answered in chapter 5 and 6, which are directly concern to analyse BOCIMI (Bogor, Ciawi, and Sukabumi) road network. Recommendation for better institutional setting to reach the sustainable mobility in BOCIMI road network will be explored in chapter 7. However, before focus to study case, three sets of **preliminary questions** have to be answered to provide a scientific theoretical and contextual framework to this thesis:

1. What is sustainable mobility? What is the definition and what are the indicators to measure the sustainable mobility realization?
2. What is decentralization system? How can decentralization system influence the integration planning between land use and transport system?
3. What are the main characteristics of Indonesia's transport and land use planning relates with decentralization system? Where is the position of BOCIMI's institutional authority in between decentralization system generally?

The first and second questions are answered in chapter 2 which is explains the review of the literature on sustainable mobility, decentralization, and integration between land use and transport. Chapter 3 will answer the third question, more explanation about decentralization system in Indonesia.

1.5 Structure of Thesis

This thesis is divided into seven chapters which are related to the research questions above. The short explanation about all of the chapters can be described as the following:

Chapter 1 : General condition in Bogor, Ciawi, Sukabumi (BOCIMI) road network relates with decentralization system in Indonesia, problem statement, the importance of this research, aims and some research questions.

Chapter 2 : Theoretical framework explanation as answers for the first and the second preliminary research questions on a basis of a review on sustainable mobility literature, relates with decentralization system and integration planning concept between land use and transport network.

Chapter 3 : More description about the characteristic of land use and transport planning in Indonesia, especially government's policy for BOCIMI network. This chapter will answer the third preliminary research question.

Chapter 4 : Explanation of the data used in the case study and the methodological path will be taken to answer the three main research questions.

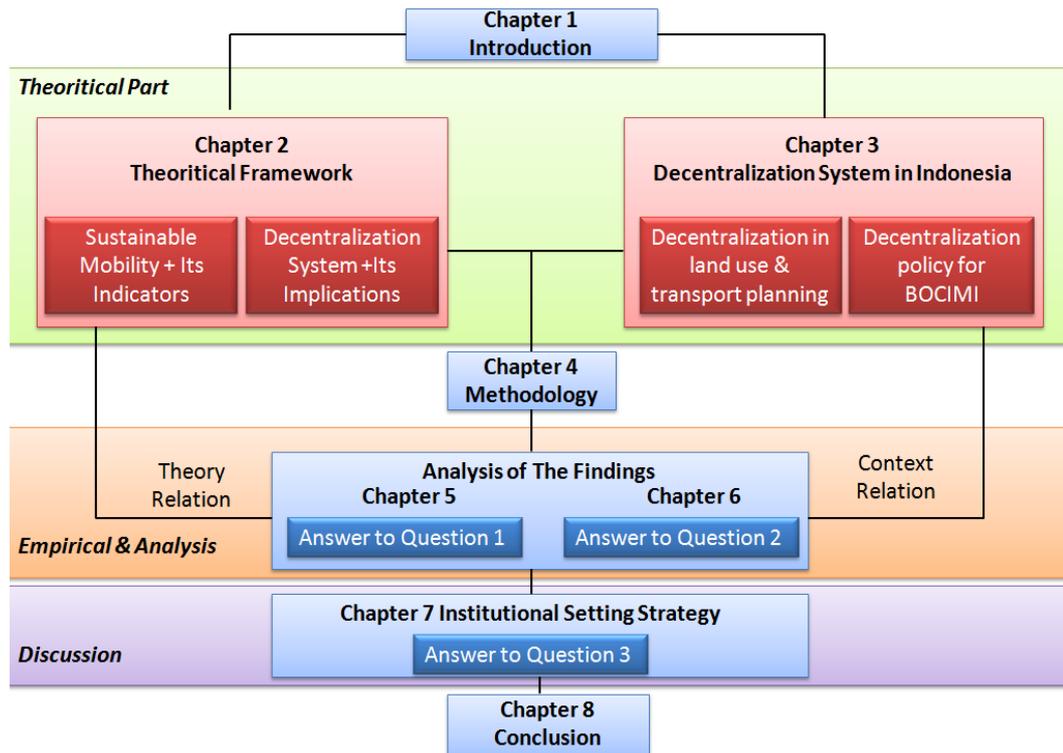
Chapter 5 : Detailed description of current BOCIMI road network and land use pattern, and its correlation with sustainable mobility indicators. Comparative description will be analysed in this chapter to find the changes in transport system and its road network performance based on sustainable mobility indicators.

Chapter 6 : Elaboration of wicked problem in decentralization era, relates with interaction between stakeholders to promote sustainable mobility in BOCIMI road network. Besides that, this chapter will explain the influence of decentralization failures to road network performance and the integration between land use and transport system in BOCIMI.

Chapter 7 : Recommendation of institutional setting to promote sustainable mobility in BOCIMI road network based on the failures that can be found in chapter 5 and chapter 6.

Chapter 8 : The final parts, includes conclusions summarising the results of this thesis and a general reflection of the strategy for BOCIMI road network.

The relationship between the chapters and the research questions is presented in the figure below:



Picture 1.2 Thesis Structure

Source : Author, 2013

Chapter 2

Integration Planning Between Land Use and Transport to Achieve Sustainable Mobility in Decentralization Era

The objective of this chapter is to answer the first and the second preliminary questions. Theoretical framework will be arranged to provide a better understanding of the sustainable mobility concept and its indicators, decentralization system and its influence to integration degree between land use and transport planning. This integration will be related with network performance based on sustainable mobility concept, and it will describe how disintegration planning would decrease the network performance. The explanations about those concepts are based on literature study from books, scientific papers, and reports.

2.1 Sustainable Mobility Concept and Its Indicators

Elaboration about sustainable mobility concept is considered as essential step to analyze the sustainable mobility realization in BOCIMI area. This section interprets the sustainable mobility concept that will be used in this thesis. Besides that, the sustainable mobility indicators from various researchers also will be explained in this section. In the end of section, the indicators will be chosen to be used for this thesis.

2.1.1 Sustainable Mobility Concept

1. Sustainable Concept

Generally, “*sustainable*” concept is one of important matter in planning arena, since the planners realized that performance of planning should be perceived not only by current generation, but also by future generation in order to meet their needs. The raising of sustainable concept also passed open discourse process, many different interpretation gained, and finally sustainable concept becomes a fuzzy concept (De Roo, 2007). Haughton & Colin (1994, p.17) also agreed that sustainable phrase can’t be analysed as a single definition, but it can be simplified with “generation” and “time” context by three basic principle for

sustainable development: inter-generational equity, social justice, and transfrontier responsibility.

Time by the time, sustainable concept has evolved based on various dimensions. Drujven&Singh (1998) defined sustainable development as a conjunction of two dimensions, the first relates with management of human activities, and the second relates with controlling or limiting the harmful impacts of human activities on the environment. Further, Ciegis et al (2009) analysed sustainable development as integration between economic, social and environmental aspect which are complementair and interrelated. They considered sustainable development as a complex issue since it has to combine efficiency, equity, and intergenerational equity. Based on these two definitions, we can synthesize that sustainable development is an integration system between human activities which relates with economic needs and social equity, and the minimization of environmental effect from those activities.

2. Sustainable and Transport

Related with this thesis, sustainable concept will be combined with transport sector. Based on the explanation in **chapter 1**, we can construe that the growth of transport flow effects activities development, economic condition, social change, energy and environmental issues. Those impacts can emerge negative or positive performance, and further will cause more dilemmas between different sectors. For the example, development of transport infrastructure will emerge contradiction vision with environmental issue. The other example can be seen from dilemma between economic and financial case with development of infrastructure needed. These dilemmas certainly need to be balanced and solved. In this case, sustainability and transport issue become important to be related and analysed as a system framework. This condition is a challenge for transport planners to balance all aspects of sustainability concept with transport matter as integrated policy which can support the human's activities to meet their needs.

In line with this statement, Ritchie (2009,p.2) and Beatley (2010,p.330) underlined that transport is a vital sector which should be evolve towards sustainability concept. This importance emerged the “sustainable

transport” concept. Furthermore, Kennedy et al (2006) explained the four pillars of sustainable urban transport: governance, financing, infrastructure, and neighbourhoods. These four pillars can be used to support the balancing of three dimensions of sustainable concept: environment, economy, and society. Greene (1997) made a study about sustainable transport. He identified three main aspects in sustainable transport: implementing technology for sustainable transport, pricing and financing of sustainable transport, and integrated transport and land use for sustainable transport. Actually, those aspects have the same direction to decrease the external effects of transport system, specifically in economic, social, and environmental case.

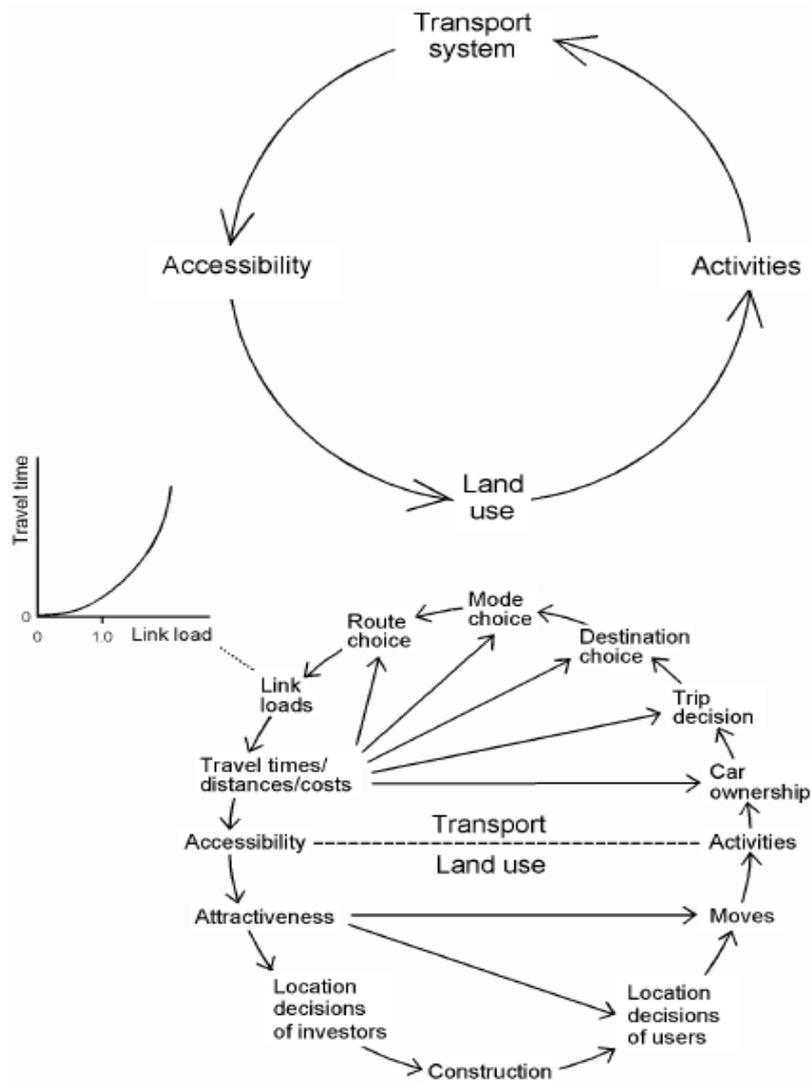
As the example of the influence of external effect in transport sector, Santos et al (2010) argued that economical instrument is an important complement in sustainability transport policy. They explained that sustainable road transport can be reached by three main elements: physical policies (increasing public transport uses, integration with land use policy, walking and cycling, road construction and expansion), soft policies (car sharing and car clubs, tele-working and teleshopping, eco-driving development), and knowledge policies (research and development). Those three elements direct or indirect influences and influenced by economical matter.

As the beginning of land use and transport integration emergence, Docherty et al (2008) analysed transport as two-inter-related meaning of space and place. Space refers to the place where economic activities happened. Place refers to bounded location where each has specific social identity. As an interaction between space and place, transport is needed to move both goods and people, and support the economic activities based on each social condition and its characteristic. Geurs et al (2010) explain deeper about the influence of integration transport and land use to economic development. They assumed that land use policy could change transport cost generalization and utility of destination. This accessibility benefit can be provided from the changes of activities distribution which involved the land use and transport policies. As the consequence, we need to realize that transport is not transport itself, but also correlated with land use

system; can't be analyzed as a sector, but the integrated system between space and place.

Berke et al (2006) described that land use and transport has feedback loop relationship. Land use characteristic can influence the characteristic of transportation services which are provided to support the activities. This explanation indicates that a revision of land use plans sometimes will be needed to support the new transportation plans. Quantitatively, Capacity Road Manual of Indonesia (1996) shows the compete relationship between land use and transport system. More land use activities emerge more side barriers and decrease road capacity. The other research result shows that transport system can influence the level of investment in a land use system. Better transport system can increase the investment value in activity centre, and finally this process emerges movement generation in that land use system. Berke's statement shows us that in the other times, transportation plan was needed to support the land use development.

Wilson (1974) in his transport model explanation argued that a basic input to build transport model is activity pattern which is determined by land use pattern. Trips are made by variety kinds of people, for a variety of purposes, on an unpredictable route and by several modes. To complete Wilson's explanation about the influence of land use system to transport model arrangement, Levinson & Kumar (1994) developed a feedback structure for transport modelling, which include demand, assignment, and traffic control instruments. In line with Levinson & Kumar, Furst & Wegener (1999) arranged the relationship between land use and transport with feedback cycle. The distribution of land use determines the location of human activities and requires spatial interactions or trips in transport system which can be measured by accessibility. The distribution of accessibility in space co-determines location decisions and effects the changed of land use system. The loop interaction between land use and transport can be seen as the picture below.



Picture 2.1 Loop Interaction Land Use and Transport Planning
Source: Furst & Wegener (1999)

In the other ways, Newman & Kenworthy (1996) analyzed the connection between land use and transport from historical context. On the last 50 years ago, the mixed use emerged walking-scale city with limited transport options. Nowadays, transit city with its fixed train and tram systems emerges sprawl pattern of the cities. Furthermore, this changes influence the physical activity (Heath et al, 2006).

3. Land Use and Transport Integration as the Supporting Matter for Sustainable Mobility Realization

One of the examples in land use and transport development is area oriented concept. Development of area oriented concept requires the importance of

integration between land use and transport system. This idea is supported by development of transport demand management that tries to minimize traffic without decrease the human's opportunity to meet their daily needs. This concept also tries to keep the balancing each sustainable dimension: economic, social, and environment. The escalation of motorized vehicle stimulates the planners to involve environmental aspect to land use and transport integration planning. The greater use of motorized vehicle emerges more pollution; both air pollution and noise pollution. In line with global warming issue, in this time environment become a main context in policy making. The integration between land use, transport, and environment bring out the "sustainability mobility" concept.

The other researchers, Kenworthy & Laube (1996) also analyzed the relationship between land use and transport integration and its sustainability. They found that the increase of automobile ownership and land use pattern can decrease the sustainability level in the city. For this case, they suggested four goals to sustainable transport development:

- a. Land use objectives (more transit-oriented, higher density, mixed land use which help the decrease of auto-based development)
- b. Private transport objectives (lower car use and less emphasis on infrastructure for cars)
- c. Public transport objectives (higher quality transit system)
- d. Non-motorized mode objectives (greater safety and amenity for walking and cycling and increased use of these modes).

Beatley (2010,p.331) also explained that urban sustainability is depend on urban form and land use pattern, and it will be important to mix those determinants with mobility concept. Although his research just concern on the importance of public transport, but it can be a starting point to develop more concept about "*sustainable mobility*". World Business Council for Sustainable Development in Nykvist & Whitmarsh (2008) defines sustainable mobility as "*the ability to meet the needs of society to move freely, gain access, communicate, trade, and establish relationships without sacrificing other essential human or ecological values today or in the future*". From sustainability concept, we can understand that in transport policy, besides economic and environmental aspect,

social issue is one of the important elements. Vergragt and Brown (2007) analyzed sustainable mobility as a social dilemma: the ecological sustainability and the individual right for providing personal mobility. This dilemma can't be solved only by technical approach, but also involve social learning, including the social and institutional changes. The government can't pay attention to the technological innovation and changes in land use and infrastructure only, but also has to engage a combination of multi-stakeholders involvement.

More explanation about sustainable mobility was done by Banister (2008) who pursued the concept of sustainable mobility paradigm as an alternative to provide integrated system between land use and transport. Banister's paradigm emerged from the idea that transport is a derived demand, and essentially people want to minimise their travel cost, including travel time and length. Vergragt and Brown's research has supported by Banister (2008) and they formulate the comparative concept between the conventional approach and sustainable mobility approach.

Table 2.1 Transport Planning Approach Comparison

The Conventional Approach - Transport Planning and Engineering	An Alternative Approach – Sustainable Mobility
Physical dimensions	Social dimensions
Mobility, demand based	Accessibility, management based
Traffic focus, particularly on the car	People focus, either in (or on) a vehicle or on foot
Large in scale	Local in scale
Street as a road, segregation of people and traffic	Street as a space, integration of people and traffic
Motorised transport	All modes of transport often in a hierarchy with pedestrian and cyclist at the top and car users at the bottom
Forecasting transport	Visioning on cities
Modelling approach	Scenario development and modelling
Economic evaluation	Multi criteria analysis
Travel as a derived demand	Travel as valued activity as well as a derived demand
Travel time minimisation	Reasonable travel times and travel time reliability

Source : Adapted from Banister, 2008

Based on the explanation above, we can conclude that sustainable mobility is important to be reached. The integration between land use and transport

becomes an essential factor to achieve coherent condition between economic, social, and environment, both for current and future generation. Since social dilemmas, sustainable mobility not only can be seen in technical view, but also as social view, with the differences of stakeholder’s interests and background. This condition requires the involvement of government and the other institutions in “*governance*” system that has concern about sustainable mobility.

2.1.2 Sustainable Mobility Indicators

Indicators are needed to make the abstract concept become measurable. To be exact, researchers compiled several indicators to quantify “sustainable mobility” concept more definite. Nicolas et al (2003) suggested the integrated approach to measure sustainable mobility concept. They relate the sustainability indicators on the same basis of mobility. They divide sustainable indicators based on the triangle of sustainable concept. To get the end result, they linked all indicators by description analysis, not by causal analysis. Their dimension can be seen on the **table 2.2** below.

Table 2.2 Description of Sustainable Mobility Indicator

Dimension of Sustainability	Indicator
<i>Mobility</i> Service provided Organization of urban mobility	Daily number of trips Structure of trip purposes Daily average time budget Modal Split Daily average distance travelled Average speed
<i>Economic</i> Cost for the community Expenditures of the participants involved	Annual costs chargeable to residents of the conurbation, due to their mobility in this zone Household : Annual average expenditures for their urban mobility Companies : Cost of employee parking Subsidies to employees (company cars) Possible local taxes Public Authorities : Annual expenditures for investments and operates
<i>Social</i>	Proportion of vehicle owning Distance travelled Expenditure for urban mobility :

	<ul style="list-style-type: none"> a. Amounts for public/private transport; for fixed/variable cost of car b. Share of the average income of households
<i>Environmental</i> Air pollution-global issue Air pollution-local issue Space consumptions Other items	Annual energy consumption and CO ₂ emissions Levels of CO, NO _x , hydrocarbons and particles Daily individual consumption of public space involved in travelling and parking Space taken up by transport infrastructure Noise intensity levels Risks of accident

Source : Adapted from Nicolas et al, 2003

Banister (2008) with his paradigm about sustainable mobility require some actions to reach the sustainable mobility: reduce the trips by substituted technology, stimulate modal shift as transport policy measure, reduce travel length as land use policy measure, and promote greater efficiency in the transport system by technological innovation. Different with Nicolas, Banister analyzed the indicators by qualitative approach; learned from social and stakeholders involvement. As the result, he proposed four key elements of sustainable mobility paradigm:

- a. Make the best use of technology to change the travel behaviour, including technology investment, information system, and transport system itself.
- b. Regulation and pricing as the consequences of external effect of transport.
- c. Integrated policy and regulation between land use and planning.
- d. Acceptable information about the policy to stimulate stakeholder's involvement.

Gudmundsson (2003) strengthened that to measure sustainable mobility, it has to be made operational, either quantitative or qualitative approach. The indicators can be built as an indicator system, which involved all aspects of sustainable mobility. This indicator system should:

- a. Provide a comprehensive picture that describes current environmental pressures and mobility's impact.
- b. Identify the causal factors which influence the changes of environmental impact.
- c. Relate environmental indicators to relevant sustainability values and targets to indicate the gap between them.

- d. Measure policy commitment, objectives, and targets for sustainable mobility.
- e. Feed information from the first four points back into the process where mobility policies are formulated and implemented.

Gudmundsson’s idea about indicator system is very reasonable, because sustainable mobility is not only about technical or physical approach which can be measured by quantitative data, but also include the people’s opinion about the concept which can be analyzed by qualitative data. As the answer of indicator system, Gilbert&Tangaay (2000) combined the quantitative and qualitative measurement of sustainable mobility. They classified the indicators into three sustainable domains. The indicators can be seen as the **table 2.3** below.

Table 2.3 Quantitative and Qualitative Indicators

Environmental Domain	Societal Demand	Economic Demand
Limiting emissions	Meeting access needs of individuals	Affordable
Limiting waste	Meeting access needs of society	Efficient operation
Minimizing consumption of non-renewable resources	Access needs are met consistent with ecosystem health	Choice of transport mode
Reusing and recycling of components	Access needs are met consistent with human health	Support for a vibrant economy
Minimizing land use	Access needs are met safely	
Minimizing noise	Access needs are met with equity within this generation	
	Access needs are met with equity across generations	

Source: Adapted from Gilbert & Tangaay (2000)

This thesis tries to relate the mobility and sustainability concept, analyzed two concepts as an integrated system which are measured by quantitative and qualitative data. In order to reach the optimum result, it is important to choose the relevant indicators with current condition in study case analysis. Based on several literatures about sustainable mobility’s indicators, this thesis takes the indicators below.

Table 2.4 Some Indicators That Will Be Used For Thesis

Dimension of Sustainability	Indicator
<i>Mobility</i>	Daily number of trips Travel Time Average Speed Integrated Land Use and Transport (Travel Length)
<i>Economic</i>	Travel cost budgeting Companies : Cost of employee parking Subsidies to employees
<i>Social</i>	Amounts for public/private transport (Modal Split)
<i>Environmental</i>	Annual energy consumption

Source: Author, 2013

As the explanation before, sustainable mobility is important matter to be reached. But, it is not easy to promote the sustainable mobility in the network. Himanen et al (2005) found the difficulties of sustainable transport realization. Different interest, needs and views, makes the lack of increasing integration. These differences can be a potential factor in motorized vehicle increase, and far away from sustainable condition. Ciegis et al (2009) also argued that the organization (institutional) dimension is an important thing to achieve sustainable development. This system has to be supported by institution who consider about the current and future economic, social, and environmental stability. The explanation about how institutional can influence the sustainable mobility realization will be explained in next section.

2.2 Decentralization System and Its Implications

The changed of centralization toward decentralization system became the important issue in this thesis. Surely, this shifting influenced the land use and transport organizing. Relates with that transformation, this section explains decentralization concept and its implication to planning arena from theoretical perspective.

2.2.1 Decentralization Definition

Decentralization system of government has been developed since the growth of democratic ideology. This terminology was emerged in 1981 when Nagoya

meeting happened (Oyugi, 2000). De Roo (2003) argued that decentralization system emerged when the shifting from vertical and hierarchical decision making towards more horizontal form was happened. This transformation allowed the development of “*shared governance*” concept that requires institutional action changing become more inter-subjective.

Tsamareb (2005) defined decentralization as “*The devolution, delegation or de-concentration of public service/functions to regional councils and local authorities. It is any act in which a national or central government formally shift power to actors and institutions at lower levels.*” Ideally, decentralization system could strengthen local and national governance by national unification, democratization and greater efficiency in public resources empowerment. In line with decentralization’s definition by Tsamareb, Oyugi (2000) classified decentralization as: devolution, de-concentration, delegation, privatization, and intermediation (transfer of functions to self-help organizations).

In practical, classification of decentralization system can be divided into three objects. Schneider (2003) divided decentralization based on three dimensions: fiscal, administrative, and political. He measured the degree of decentralization system by each dimension. Decentralization system happened when the central stakeholder play lesser role in these dimensions.

Bardhan (2002) argued that decentralization system was developed to increase the responsive and the efficiency of governmental system. In conjunction with it, decentralization system is a way to decrease the local political tensions and ensure local cultural and political autonomy. In line with Bardhan’s opinion, Work (2001) described that decentralization system can ensure that power, authority, and accountability are not concentrated in only one institution. Besides that, De Roo (2003) argued decentralization requires facilitate the participation of new social stakeholders, like Non-Governmental Organization (NGOs); and increase the democracy political power at the local or regional levels. Decentralization can also open the way to local experimentation in good governance development and of course from economic side, it can decrease the opportunity for local economic initiative.

Based on his result, Schneider (2003) concluded that each country has different decentralization degree. This degree depend on effective development of policies and procedures, the relocation of resources, the empowerment of personal capacity, dispersion of infrastructure, greater political will and stronger commitment by key players (Tsamareb, 2005).

Treisman (2002) proposed six concepts of decentralization. These concepts include:

- a. Vertical decentralization refers to government or administration level dividing, for example: central, provincial, prefectural, county, town/village.
- b. Decision making decentralization focuses on the way of each government level make a political decision with the other level.
- c. Appointment decentralization describes about which institutions at different level are involved or not involved.
- d. Electoral decentralization means determining which subnational institutions are involved.
- e. Fiscal decentralization refers to share of subnational government in total tax, revenues or public expenditures.
- f. Personnel decentralization defines as share of subnational governments in total government administrative employees.

From the explanation above, it can be argued that decentralization system is devolution, delegation or de-concentration process of public service as a function of governance system, which involve government, market, and society, from national level to province and local level by fiscal, administrative, and political aspect; to ensure the realization of good governance.

Based on experience of many countries, decentralization system has its own deficiency and superiorities. For developed countries, decentralization becomes a good opportunity to improve stakeholder's involvement and democracy. However, it will emerge a new dilemma when unbalanced condition happened between each region. Additionally, Hudalah et al (2013) found that institutional fragmentation in decentralization system makes the lacking of coordination between urban boundaries.

Finally, based on commentary above, decentralization has its advantages and disadvantages. The shifting from vertical governance to shared governance allows the people from various realms are included in planning process, and guarantee the social right from democracy fathom is realized. In the other hand, the failures of decentralization system also can be appeared in governance system, included in transport planning matter. This failure becomes a challenge for the planners to improve decentralization in order to promote sustainable mobility realization.

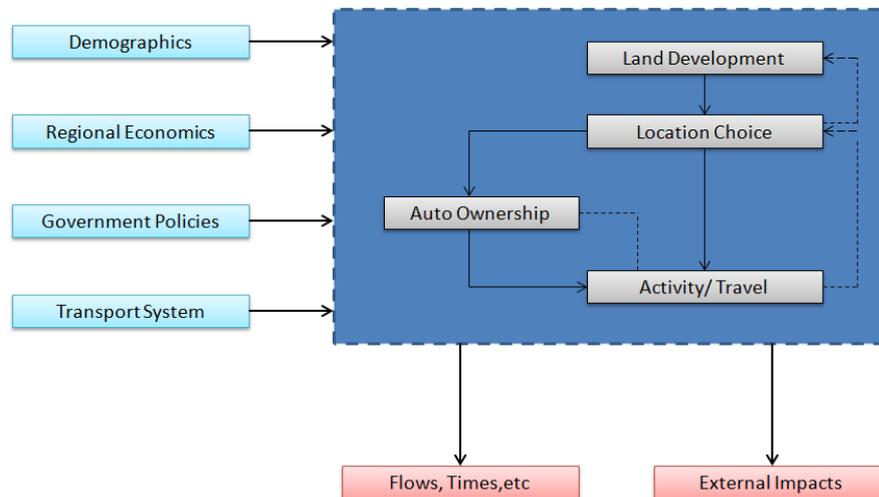
2.2.2 Influence of Decentralization System To Land Use and Transport Planning Integration, and Network Performance

As the explanation in **section 2.1**, sustainable mobility requires integrated planning between land use and transport system. Definitely, both government institution and non-government institution influence the successfulness of sustainable mobility. This statement can be supported by Kennedy et al (2006) who explained that governance is one of the pillars for sustainable transport development. The integrated planning between land use, transport, and environment needs co-operation and government involvement. Integrated policies and mechanism are needed to solve cross-sectoral issues, while each department has different objective and mechanism (Geerlings & Stead, 2003). Decentralization as a part of governance systems certainly can influence the land use and transport integration. This section explains in what way the institutional system may influence the integration between land use and transport network.

As the explanation in **chapter 2.1**, this concept can't be seen as technical context, but also as social context, relates with actor involvement, collaborative approach, and deliberation process. Kusbiantoro (1994) described that institutional system can influence the interaction between land use and transport system. It means that government have an important role to organize the synergy between land use and transport system to provide "sustainable mobility".

Another researcher, Miller (2004) analysed the requirements for integrated land use and transport planning. Similiar with Kusbiantoro, Miller (2004) also considered that institutional by government policies is really important to build

integrated planning. He concluded that policy sensitivity determines the credibility of integration between land use policies and transport policies. The framework model of that influences can be seen in **picture 2.2** below.



Picture 2.2 Integrated Urban Modeling System Frameworks
Source: Miller (2004), p.148

Further, Wilson (1974) explained that that form of government organization, including its regulation, can affect the resource objectives achievements within transport network and land use system. For the example, in New Zealand sustainable development is fully regulated by national government. The system runs as hierarchical with strong and open communication with regional and district government (Ericksen et al, 2004). In the end of their analysis, Ericksen et al (2004) conclude that hierarchical system causes the weakness of planning, the wickedness of governance and the high risk of governmental concerns.

As the explanation in **section 2.2.1**, the failures of vertical government provoked the emergence of shared governance, as intermediate system that answers the lacking of horizontal and vertical governance. Shared governance requires the interaction between actors, within and outside formal organization (De Roo, 2003). This interaction makes planning arena becomes more complex and emerges the various discussions about shared governance.

Marsden and May (2006) with their analysis result about the influence of institutional arrangement to transport policy and its implementation in Britain support this thesis aim, relates with the influences of institutional change to

sustainable mobility achievement. Pemberton (2000) analyze “institutional” word as a system which consist of actors, arenas, networks, and discourse within and between the transport sector and policy arena. Because of that, in this case, participation of each actor becomes important to be done.

Curtis (2008) underlined participatory approach as a requirement to achieve sustainable mobility. But, this achievement could be more complex when it has community involvement in the process. Because of that, it needs strong leadership and a proactive approach from the government to all of stakeholders. Spangenberg (2001) indicate institutional system as a part of sustainability development. Institutions are the result of inter-personal process, such as communication and cooperation, result in information and system which provide some regulation of interaction between societies.

Glesson et al (2004) supported Curtis’s opinion about participatory in integrated land use and transport planning. They underlined democracy as an element to reach the sustainable condition, beside policy, space, planning governance, and finance aspect. As the consequence, actor involvement in multilevel governance is important to be realized (Heeres et al, 2012).

As one of the kind of governmental contexts and the result of democratic ideology, decentralization system surely influences the degree of land use and transport integration. Further, Work (2001) argued that decentralization with participation base will help the realization of sustainable condition.

Although decentralization has positive affects; the development also has the drawbacks. Fiscal, administration, and political decentralization emerges “stand alone development” principle in region building process (Bertha, 2009). Privatization allows each region to develop their resources, and do the activities in their land use system. On the other hand, transport system can’t be analysed as “stand alone development” principle, because basically, transport is a network which can be bounded by territorial boundaries. Finally, this dilemma causes less road network performance. Travel time and travel cost would increased, but the accessibility would decreased. The growth of activity is not supported by the road network development.

2.2.3 Collaborative Approach

Based on the explanation in this section, we can conclude that institutional system influence the integration between lands use pattern and transport network. Decentralization system can be done to achieve the sustainable development. Although it can increase the actor's involvement from all level of governance, but decentralization also has its dilemma and it is not a panacea of all city's illness (Work,2001). Because of that, it is important for us to improve the failures of decentralization era to achieve the sustainable mobility, particularly relates with institutional setting and communication procedure between each actors who are involved in planning arena. To solve this deficiency, especially in infrastructure planning, Bertha (2009) proposed the collaborative approach and its five attributes. These attribute raise from the implication analysis of decentralization system in Indonesia, which could be seen from administration, financial, formal planning system, and spatial planning aspect. Bertha argued that the five attributes can be realized in interregional infrastructure development to deal with decentralization failures in Indonesia. Consider that there are many similar objectifications with this research; Bertha's attributes will be used to measure the degree of effectiveness of decentralization system in BOCIMI road network case. In line with Tsamareb's idea, Bertha agree that competency of human resources is a key element to fulfil the lacking of decentralization problem. This competency relates with ability in applying the collaborative attributes.

Table 2.5 Attributes for Collaborative Approach

No	Attributes	Properties	Functions	Target	Goals
1	Shared	Resources Risk Responsibility	Control Monitor, standard operational and procedures	Power balance, innovation	Strategic Policy; integrated framework, effectiveness, efficiency, mutual benefit
2	Access	Human Information Tools	Planning related knowledge Operational	Standard instruments, equal ability	
3	Commitment	Coalition Coordination Cooperation	Willingness to work Partnership Acceptance of Contract	Consistency Participation Mutual Understanding	
4	Connector	Horizontal	Avoid conflict Avoid perceived others Avoid positional bargaining Protects stakeholders rights	Equality Mutual Understanding	
5	Eligibility	Effectiveness	Time, content, context, and process	Goals and objectives accommodate;	

		Competency Accountability Transparency Integration Efficiency	Ability applying attributes Responses Openness, trust, avoid conflict & misunderstanding Consensus building Activities, services, output, outcome	interregional problems, synchronization, integrated framework, money follow function	
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Source: Adapted from Bertha, 2009

1. *Shared*

“*Shared*” attribute means the flow of resources, risk, and responsibility between higher and lower government level, including non-governmental stakeholders. The flow of those properties can be exist by standard operational procedure, communication and information flow guidelines. This attribute also including funding resource or subsidiarity between each level of stakeholders. As the consequence of decentralization in governance system, the subsidiarity mechanism can not only involve government organization but also non-governmental stakeholders.

Kennedy et al (2006) analysed two perspective on alternative transport funding. Firstly is the payment of traffic’s external effects by road pricing or traffic congestion. The result of this payment should be used for sustainable mobility development, relates with balancing between social, environmental, and economical concern. The second is take the government or private sector as the sources of funding. This perspective allows the funding flow from higher governance level to lower level.

Risk and responsibility sharing are needed to involve each governance level, from national until local level. Horizontally, this sharing also involving non-governmental stakeholders like industrial community, investor, NGO, and public.

2. *Access*

“*Access*” attribute relates with human knowledge and information flow. This attributes really important for goal achievement. Human as the subjective of planning take important role with their knowledge, ability, and behaviour. Furthermore, how can that human canalize the information for the others also important to build the optimum communication between them. Koch&McGrath

(1996) explained the importance of human resource investment for institution. They described there are three steps that should be taken in human resource investment, they are : investment in human resource planning, investment in hiring, and investment in employee development. Besides investation in human resource, Soliman & Spooner (2000) concluded that human resources department also should take a part in driving knowledge. They identified eight guidelines to managing the knowledge:

- a. Synchronize the human's knowledge with the goal direction;
- b. Identification of the advantages of knowledge improvement;
- c. Choosing the suitable knowledge improvement;
- d. Implement a know-how strategy;
- e. Creating supportive environments for knowledge improvement;
- f. Use of enabling technologies;
- g. Creating the knowledge management team; and
- h. Creating leadership knowledge.

3. *Commitment and Eligibility*

“*Commitment*” attribute is depending on trust, the “*eligibility*” of institution which can be assessed by the other stakeholders. This attribute also relates with the willingness of stakeholders to be involved and make the coordination path between each other. Koppenjan & Klijn (2004, p.212-239) proposed the institutional design which could be used to increase the willingness of commitment building. Generally, this strategy consists of composition of the network, network outcomes, and network interaction. This strategy can be generated as:

- a. Formulate the actor's position, based on the competencies and each domains of actors;
- b. Introduce new actor, like connector body or infrastructure investor;
- c. Arrange professional codes to influence the ways of looking and acting;
- d. Arrange conflict regulation mechanism;
- e. Creating standard operating procedure of interaction;
- f. Determining the quality of interaction by certification;

- g. Regulating supervision process;
- h. Reframing actor's interpretation by policy documents and administrative stories;
- i. Build guiding concept which makes actors sensitive to policy realization;
- j. Using crisis as policy windows opportunity to build new resistance condition;
- k. Increased the trust; and
- l. Including the politicians in planning process.

4. Connector

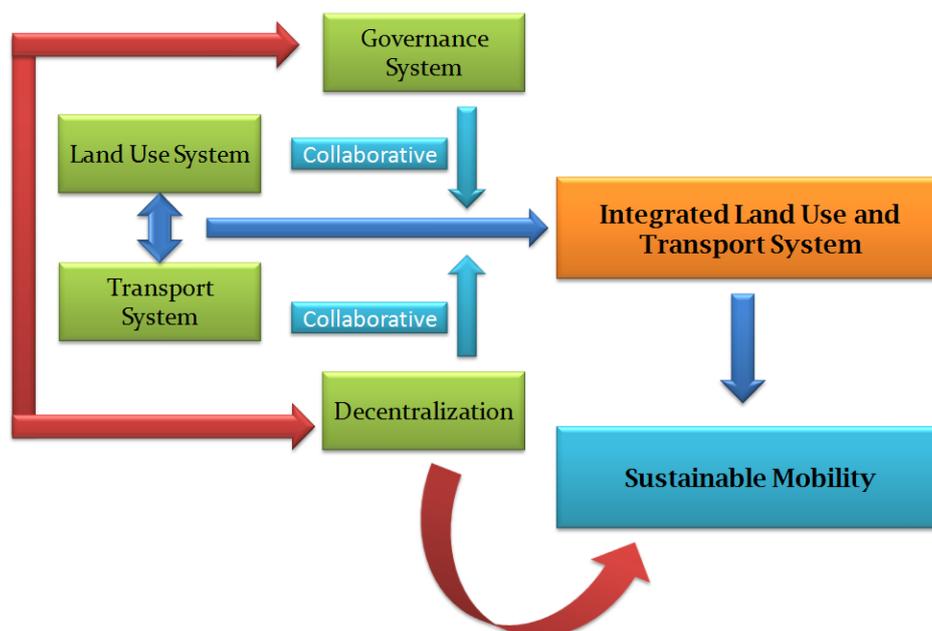
“Connector” attribute means mediator body who can engage the interests from each stakeholder. This body have a main task to get the optimum interests compliance. This connector body relates with advocacy planning which was introduced by Almendinger (2009,pp.148-171). Eden & Ackerman (1998,p.372-378) proposed several guidelines to optimise the role of connector body as advocate of planning process.

- a. Provide the stakeholders with a sense of control by manage their role and involving the stakeholders in designing workshop directly;
- b. Do not hide potential dangers of participative methods, point out them into deeper process of actor involvement;
- c. Provide information about the benefits and the disadvantages from participation process to each stakeholder relates with their interests and their roles;
- d. Ensure the suitability between task, mediator skill, and the organizational setting;
- e. Negotiate the design for strategy making process;
- f. Build the deepest understanding about the issue and each institutional culture that involved in planning arena.

2.3 Theoretical Framework

Based on the explanation before, Land use and transport network system are two essential things in urban development. Land use system determines the activity pattern, and transport network becomes a supporting instrument to facilitate those activities. There is inter-connection interaction between land use and transport system. Land use development can generate the movement, both freight and human movement. Otherwise, transport network can be a pioneer to emerge more activities. Because of that, land use and transport can't be seen as separated aspect, but they must be integrated. Land use characteristic can influence the characteristic of transportation services which are provided to support the activities. Moreover, the characteristic is also influence the sustainable mobility realization. This explanation indicates that a revision of land use plans sometimes will be needed to support the new transportation plans. In the other hand, transport system can influence the level of infestation in a land use system.

Relates with the problem, theoretical framework can be related with institutional issues, decentralization, institutional setting, integration planning between land use and transportation network to reach the "sustainable mobility". Institutional and all of stakeholder which are involved become entities of sustainable mobility realization through collaboration of all stakeholders and collaboration between technical and communicative approach. The theoretical framework for this thesis can be described by the picture below.



Picture 2.3 Theoretical Framework
Source: Author, 2013

The successful of sustainability mobility depend on the level of integration between land use and transport system. Institutional system can influence the interaction between land use and transport system. It means that governance system have an important role to organize the synergy between land use and transport system to provide “sustainable mobility”.

Development of democracy ideology and social dynamic condition stimulate the emergence of decentralization system. Although there are many advantages in this system, decentralization also has its failures. BOCIMI’s case show that local authorization between Bogor, Ciawi, and Sukabumi make self development on land use system, and it make disintegration between land use and transport policy. In the other hand, sustainable mobility still needs to be achieved. Decentralization failures cause the needs of new method in planning practices, new stakeholder relationships and interaction, and also better skill of planners. If we talked about stakeholder relationships, surely government has an important role to lead this relationship. Government, as the trigger of planning process have to make development concept and involved all of stakeholders in this policy arrangement. In decentralization era, collaborative approach can be a choice for government to increase the actor’s involvement in planning arena. This approach also can be useful to increase the governance system performance in order sustainable mobility realization. Both, technical and communicational approaches have to be done in this process.

Chapter 3

Indonesia Land Use and Transport Planning in Decentralization Era

This chapter describes the condition of land use and transport planning in Indonesia relates with decentralization system. Policy's characteristic is explained to answer the third preliminary question. The explanation about decentralization will be arranged based on regulation study and also previous research about decentralization in Indonesia. Besides explain about the general characteristic, this chapter will describe the BOCIMI's policy in decentralization system.

3.1 Indonesia Land Use and Transport Planning Decentralization

Decentralization in Indonesia begins in 1999 with the changes of administration and financial sector. This changed was regulated in the Law No. 22 Year 1999 and No.25 Year 1999. Furthermore, those regulations have been revised with law no.32 year 2004 and 33 year 2004. Decentralization in administration and finance has been a lot of changes, especially in terms of facilitating the direction of development. However, surely, this is very early to expects that decentralization is a better way to create the development because there are still many deficiencies in the implementation.

In line with the explanation about decentralization system with its devolution, delegation and de-concentration, by Tsamareb (2005) (**section 2.2.1**) , Law No 22 Year 1999 has been produced a changes for de-concentration and devolution of authority. In this case, some of the authorities move from the top to the lower level of government, from vertical towards horizontal relationship (Roo,2003). This transfer policy brings its own challenges and causes a large number of conflicts between regions. In general conflicts occurred under the unclear policy of authority system and its communication path. This condition was emerged because of different interests between regions. Besides that, this condition causes the differences in the use of infrastructure function, especially for road network.

Schneider (2003) divided decentralization into three dimmension : fiscal, administrative, and political. Regarding his dimmensions, Legal Law No.33 Year

2004 describes the division and the fiscal balance between central and local government (administrative concern), based on own capability to increase the economy activities.

Bertha (2009) explained that the formal planning system in Indonesia which is stated on Law No 24 year 2005 is called “MUSRENBANG”, also related with the implementation of the decentralization law both in the administrative and fiscal fields. Indonesia planning system is a bottom-up planning system. The system divided into 3 levels of planning: local, regional, and national. Each level of planning is included in participation process of all stakeholders. The forum will discuss the issues, propose the problem solving in planning arena. Bertha (2009) also explained about MUSRENBANG process in planning arena “MUSRENBANG is a forum to reach consensus building in the case of discussion about area development. Basically, MUSRENBANG more focus to the development of regional planning. In this formal planning system, MUSRENBANG focuses on regional development and its funding. Surely, the desired development sometimes should face limitation and constraint. Consequently, when the expected development programs which can't be funded in the local region, it can be complemented with an alternative fund from the provincial or national government. The development program that can't be funded by local governments will prioritize at the provincial level. And the programme from provincial level (cumulative from the local area) which cannot be provided by province government will prioritize again at national level. Unfortunately, in practice all MUSRENBANG levels from local to provincial, each representative only focusing planning programme in its own area without concerned the development between regions.”

Land use planning in Indonesia divided to national, provincial, and local level. According to the legal no 32 year 2004, the government also has authority to make its own land use plan. Consequently, the establishment of the land use plan is related with the interests of region within the boundaries of their own administration. Furthermore, the correlation can be drawn back to the field of fiscal decentralization policies in legal no 33 year 2004, with its implication to

each area in increasing the revenue for the original income by resources exploitation without consideration to the surrounding environment.

Law Number 26 Year 2007 About Land Use Pattern regulates the division of land use authority. Generally, national government has roles to regulate, develop, and supervise the implementation of national, province, and local land use pattern. Besides develop land use pattern in province and local level, province government also has a role to facilitate the cooperation process between local governments. As the spearhead of land use implementation, local government has roles to apply the minimum standard of land use pattern and provide detail information about its land use pattern.

Land use policies are made into Land use planning. This land use planning is divided into National Land Use Planning, Province Land Use Planning, and Local Land Use Planning (RTRW). Actually, RTRW should follow the local policy in generating local income, whereas in the fact that each region will create a programme based on its ability with its own characteristic, strength, ability, and a different way in order to increase their income. As the consequence, this perception will affect the land use structure of the RTRW.

Relates with transport network, decentralization of administration and finance bring influences for the interregional relationship. As land use planning, transport planning also divided into national planning (TATRANAS), provincial planning (TATRAWIL), and local planning (TATRALOK). The main constrains in this sector are in financial problems both in the provision and maintenance. In addition, the development of transport network is also faced by changes of the function that causing the damage and leads to the high cost in maintenance. No less governments are throwing a lot of responsibilities to other administrative areas, and definitely affected to the interregional conflict.

As we know that transport network is a link between a nodes, area, and regions in the activities, whether it for economic or social. As a network, transport connecting the access to economic and social that brings changes in development. When the connection is not synergy, it is very difficult to bring a positive change in development.

3.2 BOCIMI Network's Position in Decentralization Context

BOCIMI network is a network that connected two cities: Bogor and Sukabumi, part of West Java province. As regulated in province land use planning (Province RTRW), those two cities are really strategic cities which have a role to support the main activities in the business centre district of Indonesia, we called that JABODETABEK (Jakarta, Bogor, Depok, Tangerang, and Bekasi). **Table 3.1** below described the position of Bogor and Sukabumi in province land use planning.

Table 3.1 Province Land Use Planning in West Java, Indonesia

NO	Cities	PKN (National Activities Centre)	PKNP (National Activities Centre Promotion)	PKW (Regional Activities Centre)	PKWp (Regional Activities Centre Promotion)	PKL PERKOTAAN (Local Urban Activities Centre)	PKL PERDESAAN (Local Rural Activities Centre)
1.	Kota Bekasi	Kawasan Perkotaan Bodebek					
2.	Kab Bekasi						
3.	Kota Bogor						
4.	Kab Bogor						
5.	Kota Depok						
6.	Kota Sukabumi			Sukabumi			
7.	Kab Sukabumi		Palabuhanratu	Palabuhanratu		Cibadak	Jampang kulon Sagaranten Jampang tengah

Source: RTRW West Java Province, 2009

Bogor is one of national activities centre (PKN) and Sukabumi is regional activities centre (PKW). Moreover, one part of Sukabumi, Pelabuhan Ratu is promoted as national activities centre. Every local government has own authority to regulate their land use pattern based on their function and position in province land use pattern.

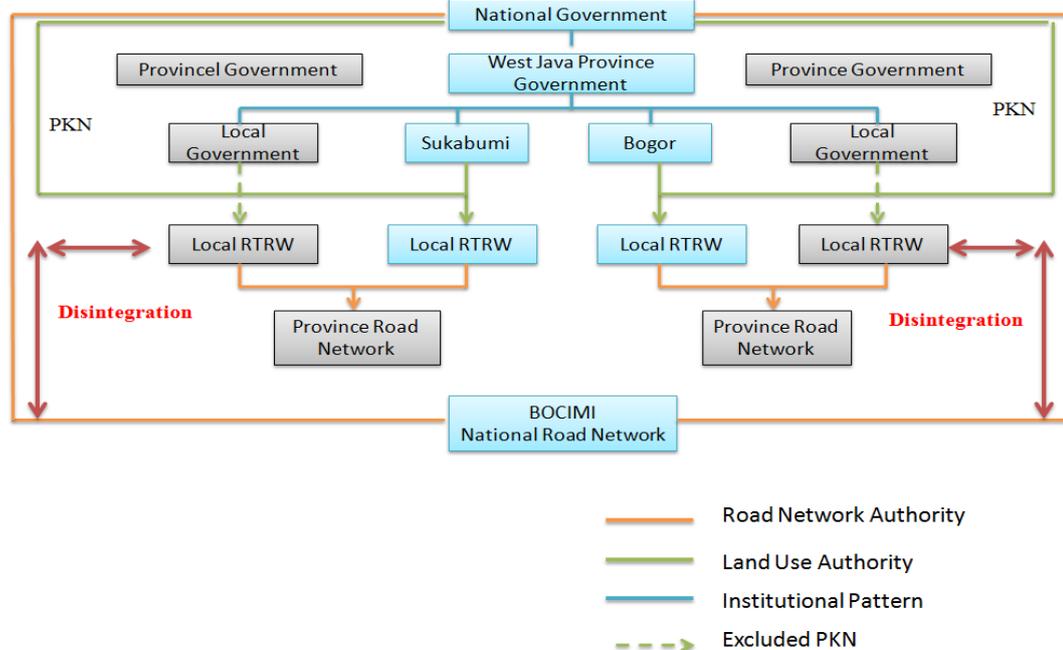
Legally, the road network regulation in Indonesia is regulated by Law No. 38 Year 2004. This network system was arranged by transport ministry based on the hierarchy of land use planning which is arranged by national planning institution. Road network system in Indonesia divided into two main characteristic: *Primary road network* (connects all of regions in national level) and *Secondary road network* (support urban activities). These kind of network divided based on their functions:

- a. Artery road network: supported main activities, long length, and high velocity.

- b. Collector road network: travel length and velocity are in intermediate values.
- c. Local road network: supported local movement, less travel length and lower velocity.

In line with decentralization system, each road network function is divided based on the authority. National road network consists of artery and collector road network which are connected the centre of province, and strategic national road, and toll road. Province road network is a collector road network which is connected the centre of province with centre of urban/rural, or inter urban/rural, or strategic national road. Local road network is secondary road network which is connecting the central business district (CBD) in rural/urban areas.

Picture 3.1 below explains that BOCIMI road network is a national road network which is regulated by national government. From land use perspective, each local government has own local land use planning (Local RTRW). Nevertheless, as a part of national activities centre (PKN), ideally the local RTRW has to in line with national government’s land use policy. In the fact, each local government make land use policy development as local interest, not with global thinking. Consequently, there is a lacking of integration between land use policy by local government and transport policy by national government.



Picture 3.1 Regulation about BOCIMI Position in Decentralization Era
Source: Author, 2013

Based on its land use characteristic, can be conclude that BOCIMI network is a *National Road Network*, because it connects two national activities centre. If we analysed from road function aspect, national road network is consists of artery and collector road network, where there has to be high performance with high velocity. Velocity is related with delay function, and delay function depends on the degree of activities besides the road network. In the fact, BOCIMI as national road network can't provide high velocity for the road user. In this case, we can conclude that the bigger density of activities make the decrease of BOCIMI network performance. It can be emerged because there is no integration between land use and transport planning by each authority.

3.3 Concluding Remarks

Decentralization in Indonesia certainly stimulates the realization of democracy and allows all of the actors in multilevel governance to involve in planning arena. Unfortunately, this system also has negative consequences for perceived performance in road infrastructure development. Based on the illustration in **section 3.1** and **3.2**, the consequences of decentralization system for infrastructure development, especially in BOCIMI road network case can be mentioned as:

- a. Decentralization system in Indonesia has changed financial and administration procedure in infrastructure development. Theoretically, this influential correlation has explained by Schneider (2003) (**section 2.2.1**). This multilevel governance emerge the transformation authorities from top towards the lower level of government. Consequently, more authorities concern their policies for their own interest.
- b. Decentralization system also indicates the fragmentation of land use planning. "Self-development" principle affects the land use structure and function. Land use pattern is directed to maximize local's income.
- c. Similar with land use planning, fragmentation also happened in transport policy. Partition of road network status become national, province and local road network implicates the fission of financial and administration resource. Consequently, road provision and maintenance are hampered, unbalanced

development of road network in rich regions and poor regions. This condition is really contrast with primary understanding of road network development, that road can't be bounded by territorial boundaries.

- d. Related with BOCIMI case, decentralization system also implicates the fragmentation in land use and transport planning. Provision, maintenance, and development of road network become National government's responsibility. Contradiction responsibility is happened when land use authority is regulated by local government. Consequently, there is no integration planning between land use and transport network. This reality can be a proof that institutional fragmentation in decentralization system makes the lacking of coordination between urban boundaries (Hudalah et al,2013) (**section 2.2.1**), and it can influence the difficulty of sustainable mobility realization (Work (2001) (**section 2.2.2**).

Chapter 4

Methodology

This chapter explained the methodology of this thesis to answer the research questions. Generally, this thesis uses qualitative approach to answer the questions. Description analysis of transport network performance will be arranged to support the problem structuring analysis. These two analyses can be used to answer the question about the implication of decentralization for BOCIMI road network performance relates with sustainable mobility concept. The result of these analyses can be base to develop institutional strategy of sustainable mobility realization in BOCIMI road network.

4.1 Population and Sample

Sampling is one of important stage in qualitative analysis. Samples is needed and have to be selected to find the understanding of the nature and form of phenomena, to understand the meanings, to develop explanations or to generate ideas, concepts, and theories (Ritchie et al, 2003, p.82). Qualitative samples are usually less than quantitative samples. Ritchie et al (2003) explained three main reasons for this case : the evidence of a phenomena can be described by not too much data, more data can emerge more than one phenomena which is exclude from analysis boarded. Second reason is the board of influence is not a main concern in qualitative analysis, and the third reason is the type of information in qualitative analysis is reach in detail, so there will be many information from a unit data collection.

Further, Ritchie et al (2003) argued that for groups of special interest that require intensive study, they have to be included with sufficient symbolic representation. Then he explained that for individual interviews usually unders 50 samples. If they more than 50 samples, the analysis will be more difficult with less quality of data collection. It is also important to ensure that samples are not too small. It can cause the lacking of fitting condition with population, or emerges less diversity to explore the varying influences of different factors (Ritchie et al, 2003).

Relates with this research, to answer the research questions definitely the stakeholders involvement is the most important needed. To fulfil the aim, eight stakeholders are preferred as participants. Seven of those stakeholders are institution with special interest. They are: National government by Transport Ministry of Indonesia; Provincial Government by Transport Agency of West Java, Local Government by Transport Agency of Kabupaten Sukabumi and Kabupaten Bogor, Non-Governmental Organization in Transportation field, Industrial Community in Kabupaten Bogor and Kabupaten Sukabumi. Based on Ritchie's theory about sampling, these institutions will be included by the head of each institution as representations. The other participants are the society, refers to BOCIMI road network users. The population is all of the users, and the samples are 50 users which will be choose by random sampling.

4.2 Data Collection

Data collection will be done by interview survey. Question design in survey form will be based on every indicator which have preferred in **chapter 2 (table 2.4)**. Each indicator is grouped into mobility and sustainable measurement. To relate this context with decentralization system, the opinion about governance measurement will be asked to every stakeholder. **Table 4.1** below will describe the group of the dimension and its indicators.

Table 4.1. Description of Indicators

Dimension	Stakeholder	Indicator
<i>Mobility</i>	Road Users	Daily number of trips Travel time Modal Split Average speed
	Industrial Community	Daily freight activities Travel time Average speed
	NGO	Reliability of BOCIMI road network Integrated land use and transport Network efficiency Modal Choice

Dimension	Stakeholder	Indicator
	National Government	Reliability of BOCIMI road network Integrated land use and transport Network efficiency Modal Choice
	Province Government	Reliability of BOCIMI road network Integrated land use and transport Network efficiency Modal Choice
	Local Government	Reliability of BOCIMI road network Integrated land use and transport Network efficiency Modal Choice
<i>Economic</i>	Road Users	Travel cost budgeting
	Industrial Community	Travel cost budgeting
	NGO	Network role to support the economic development
	National Government	Network role to support the economic development Funding in network development and its maintenance
	Province Government	Network role to support the economic development
	Local Government	Network role to support the economic development
<i>Social</i>	Road Users	Vehicle owning
	Industrial Community	Transport subsidies for employee
	NGO	Risk Accident
	National Government	Risk Accident Equity to get better accessibility and sustainable condition Individual's right to fulfil their mobility needed
	Province Government	Risk Accident Equity to get better accessibility and sustainable condition Individual's right to fulfil their mobility needed

Dimension	Stakeholder	Indicator
	Local Government	Risk Accident Equity to get better accessibility and sustainable condition Individual's right to fulfil their mobility needed
<i>Environmental</i>	Road Users	Daily Fuel Consumption
	Industrial Community	Daily Fuel Consumption
	NGO	Air pollution emergencies Noise pollution emergencies Energy consumption
	National Government	Air pollution emergencies Noise pollution emergencies Energy consumption
	Province Government	Air pollution emergencies Noise pollution emergencies Energy consumption
	Local Government	Air pollution emergencies Noise pollution emergencies Energy consumption
<i>Decentralization</i>	Road Users	Effectiveness, competency, accountability, transparency, integration, efficiency
	Industrial Community	Effectiveness, competency, accountability, transparency, integration, efficiency
	NGO	Effectiveness, competency, accountability, transparency, integration, efficiency
	National Government	Effectiveness, competency, accountability, transparency, integration, efficiency Current road network policy Procedure to interact with province and local government Standard instruments in policy making Difficulties in decentralization era
	Province Government	Effectiveness, competency, accountability, transparency, integration, efficiency

Dimension	Stakeholder	Indicator
		Procedure to interact with national and local government Standard instruments in policy making Difficulties in decentralization era
	Local Government	Effectiveness, competency, accountability, transparency, integration, efficiency Procedure to interact with national and province government Standard instruments in policy making Difficulties in decentralization era

Source : Author, 2013

4.3 Analysis Method

To get the optimum result in thesis's analysis, the author will use descriptive and soft system methodology, that will be combined as comprehensive analysis.

4.3.1 Descriptive Analysis

Descriptive analysis results are used to describe the current BOCIMI road network performance, which are related with the integration between land use and transport, mobility degree of road users and sustainable indicators. In this research, descriptive analysis will include the ratio between volume and network capacity, average speed, energy consumption on network, and average travel cost on the network. This analysis is provided by chart or graph description. Furthermore, the result of descriptive analysis can support the strategy which is needed to realize the sustainable mobility.

Comparison description of BOCIMI road network is also included in this section. This analysis will be done to complete the explanation about influence of the failures in decentralization to disintegration between land use and transport, which is also influence road network performance from sustainable mobility perspective. Similar with general description in this research, comparative descriptive also use sustainable mobility indicator as comparison basis. Because of limited information about road network performance before decentralization system, then this thesis uses some equations to estimate last performance. The

primary sources of this estimation are vehicle growth, road capacity changed, population growth, and fluctuation of fuel price.

4.3.2 Soft System Methodology ¹

Druijven&Singh (1998) and De Roo (2003) in **chapter 2** emphasized that actor involvement is important matter as the consequence of sustainable development and decentralization system. The planning process needs appraisal result from all of stakeholders, especially about the perceived policy by each stakeholder. This concept also could be applied in BOCIMI's case, since we considered that there are many interests in BOCIMI uses. Certainly, to make it more concrete, we need a tool in this analysis. Regarding that intention, in this case SSM (Soft System Methodology) is chosen as a tool to structuring BOCIMI network's problem.

SSM focuses on organized relationship between people and their interactions. There are five general assumptions on Soft System Methodology that have to be understood in order to find out the use and the format of the methodology (Checkland, 2001), i.e.:

- a) SSM is a process for managing;
- b) Different individuals and groups will make different evaluations leading to different actions;
- c) In consciously articulating the process of managing, systems ideas will be helpful;
- d) SSM works in human activity system;
- e) SSM learns by comparing pure models of purposeful activity with perceptions of what action is going on in a real-world problem situation.

In the evolution of SSM, there was simplification of steps to be taken, from 'seven stages' (introduced by Checkland in 1981) into four main activities (renewed by Checkland and Scholes in 1990). Below is the review of four main activities (Checkland, 2000) connected with the origin 'seven stages'.

¹This section has been published as:

Novianingsih,Intan (2013). Problem Structuring To Review Scaling Policy on BOCIMI Road Network By Soft System Methodology.

1) Finding out about a problem situation, including culturally/politically.

This activity consists of two first stages in ‘seven stages’, which are “enter situation considered problematical” and “express the problem situation”. An approach in finding out a problem situation involves three related analysis (Checkland, 2001). *Analysis One* takes the intervention in the situation as its subject matter and identified the occupiers of the roles ‘clients’ and ‘would be problem solver’. *Analysis Two* looks at the problem situation as a ‘social system’. *Analysis Three* examines the situation politically by asking questions about the disposition of power.

2) Formulating some relevant purposeful activity models.

This activity is a combination of stage 3 and 4 in ‘seven stages’, which are “formulate root definitions (RD) of relevant systems of purposeful activity”, and “build conceptual models of the systems named in the root definition”.

To build a model of purposeful activity, there is a need of clear definition of the purposeful activity to be modelled (Checkland, 2001), which constructed in RD by consciously considering the elements of **CATWOE** (**C**ustomer, **A**ctor, **T**ransformation process, **W**eltenschauung, **O**wner, and **E**nvironment constraint).

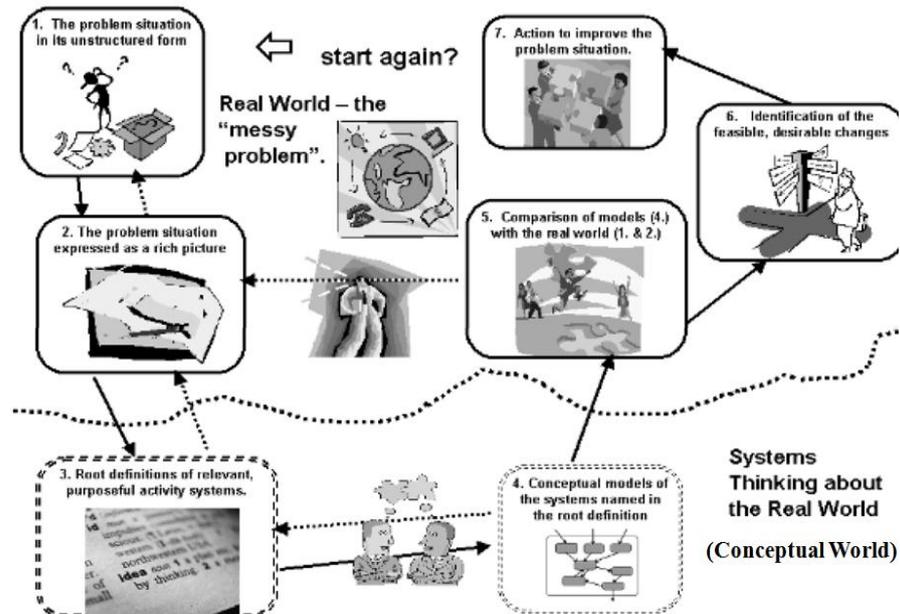
3) Debating the situation, using the models.

Seeking the changes which would improve the situation and accomodate the conflicting interests which will enable implementation. The origin of this activity is stage 5 and 6 in ‘seven stages’ which are “compare models with real world actions” and “define possible changes which are both systemically desirable and culturally feasible”. There are four ways to conduct the comparison stage which the result will be used to discuss possible changes (Checkland, 2001), i.e. 1) record the differences between models and current perceptions and happening; 2) use models to define a series of questions concerning activities and link of activities; 3) operate the activity system; 4) build a comparable model from a part of reality and overlay it with model of purposeful activity.

4) Taking action in the situation to bring about improvement.

This activity is the same with last stage of ‘seven stages’, taking action. This is the completion stage after some changes accepted as desirable and feasible have been identified and accommodations between conflicting views have been found or created (Checkland, 2001).

The whole stages of SSM can be illustrated by the picture below:



Picture 4.1. The Soft System Methodology
Source : Maqsood et al, 2000

Overall, the seven stages of Soft System Methodology will provide the structure problem of complex condition in BOCIMI’s case. The four simplification stages by Checkland (1990) are seen as general analysis. Because of that, to make this analysis deeper and can be more understood, the seven stages analysis will be simplified become six stages. These six stages can be explained below.

- a. Combine the first and the second stages: the problem expression and rich pictures.

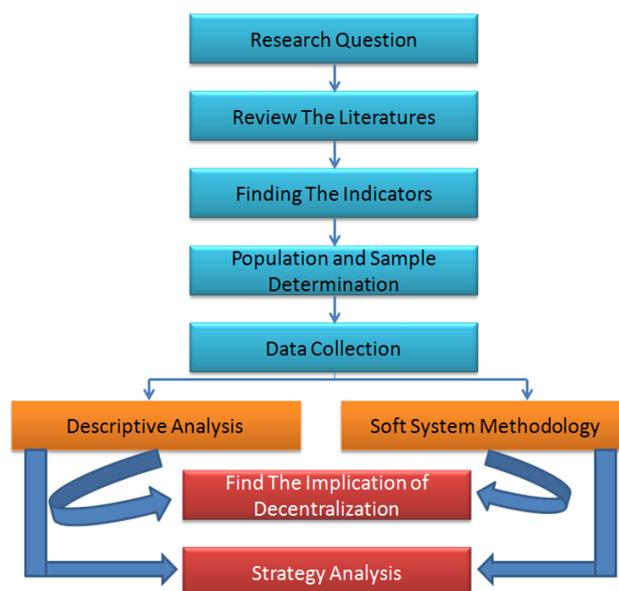
Bell and Harper in Nidumolu et al (2006) provided a list of techniques that an analyst might use during the expression phase of methodology, including interview with stakeholders, regular discussion groups, workshop and observation techniques. The intention should be to capture all relevant

information about a problem: quantitative and qualitative, objective, subjective and official. Regarding with this thesis, interview the stakeholders will be done to describe the rich picture of BOCIMI problem.

- b. Root definition arrangement by CATWOE analysis.
- c. Conceptual model based on study literature and regulation analysis.
- d. Comparison analysis of conceptual model and rich pictures.
- e. Definition determination of feasible desirable changes.
- f. Action arrangement to solve the problem situation.

4.4 Discussion

Sections 4.1, 4.2, and 4.3 above have clearly explained the methodology on this research. Literature review can help us to get more understanding about the concept relates with research questions. Besides that, literature review also can help us to find the indicators which can be used for each dimension. Sampling is needed to data collection process. This data collection is done by interview survey to each stakeholder who is have the interests about this problem. Descriptive analysis results which include empirical data will be combined with soft system methodology which include stakeholder's opinion and interest to find the implication of decentralization system to BOCIMI road network performance, and institutional strategy to reach the sustainable mobility. Briefly, the methodology of this research can be described as a picture below.



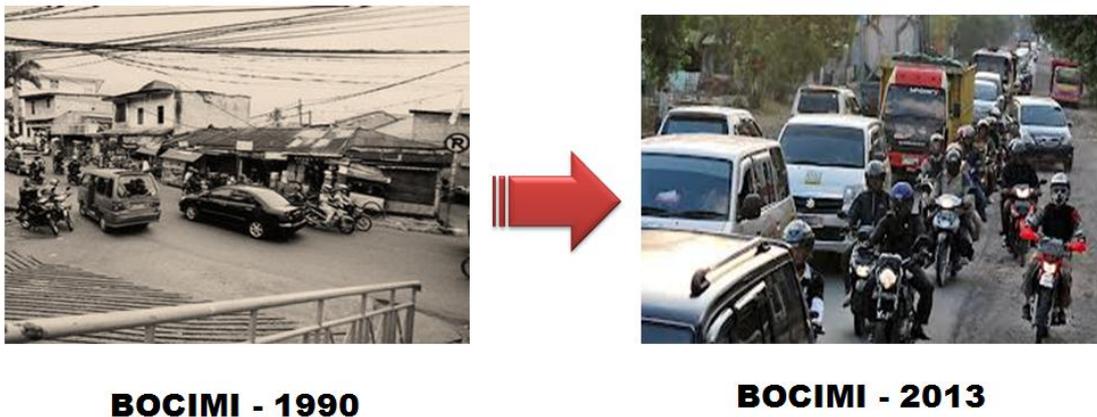
Picture 4.2 Methodology
Source : Author, 2013

Chapter 5

Description of BOCIMI Road Network Performance Before and After Decentralization Era

As explained in **chapter 1**, the main aim of this thesis is to analyse the implication of decentralization system to BOCIMI road network performance. This analysis will be explained in this chapter, and begins with comparative description of BOCIMI road network performance before and after decentralization era. According to the first research question, this chapter also analyse current performance of BOCIMI road network regarding sustainable mobility indicators. This analysis uses descriptive analysis method, based on interview result from the road users and industrial community.

5.1 Comparative Description of BOCIMI Road Network Performance Before and After Decentralization Era



Picture 5.1 Difference Condition of BOCIMI Road Network Before and After Decentralization

Source : sains.kompas.com, 1991 and news.liputan6.com, 2013

Two pictures above show us that the increasing of vehicle amount has happened on BOCIMI road network. Productive age augment, population growth, development of economic activities, and industrial area booming are generate travel demand increasing. These realities were followed by market mechanism to

increase “shadow mobility”: the easiness to get vehicle loan funding and low motorized vehicle tax. Land use and activities development also happened in Bogor, Ciawi, and Sukabumi areas. This factor combination emerges motorized vehicle explosion on BOCIMI road network. However, the capacity of road network was in unbalanced growth. Motorized vehicle on BOCIMI was increased almost 78% in 15 years (1997-2012), but at the same period the capacity of road network just increased for 21% (West Java Province Statistic Agency, 2012). In 2011, local government tried to apply demand management for freight transport by time operation regulation. Unfortunately, neither transport demand and transport supply management policy don't help traffic congestion problem.

Chapter 3 explicated that decentralization system was begin in Indonesia from 1999. There were many changes in the way of policy making, included relates with transport and land use policies. More actors involved, multi sector and multilevel procedure have changed. Necessarily, this transformation also followed by performance increasing which can be perceived by the society. Unfortunately, vice versa condition is happened in this case.

The unbalanced development between demand and supply in transport system also the shifting of centralization towards decentralization system show that transport planning is a dynamic system. Government failed to accommodate the growth of transport demand and still exclude the existence of outer government organization in policy making. Because of that, learning process becomes important step to achieve the successful of decentralization system and sustainable mobility realization in Indonesia. To make this learning process more concrete and valuable, this research provides comparative data before and after decentralization.

In this section, the comparison indicator uses each representation of sustainable mobility matter. There are four variables that we can use to compare road network performance based on sustainable mobility indicator. They are velocity (mobility representation), energy consumption (environmental representation), modal split (social representation), and travel cost (economic representation).

Velocity means the average speed of the vehicle which is run on network. Energy consumption means the amount of fuel for 1000 km travel length per vehicle. To ensure the equity issue in mobility rightness, social aspect is represented by modal split, proportion between public and private vehicle. Travel cost or vehicle operation cost represents economical concern on BOCIMI road network. In this research travel cost is interpreted as the amount of money (Indonesia Rupiah) which should be spend by total of vehicle on BOCIMI road network per hour. This comparison result can be seen on a **table 5.1** below.

Table 5.1 Comparison Description of BOCIMI Road Network Performance Before (1997) and After (2012) Decentralization

No	Variable	Value
1	Velocity	38,01 km/hour
2	Energy Consumption	107,19 liters/1000 km/veh
3	Modal Split	4 public transport : 66 private vehicle
4	Travel Cost	1.289.492 IDR.km.veh/hour

1997

No	Variable	Value
1	Velocity	27,74 km/hour
2	Energy Consumption	134,74 liters/1000 km/veh
3	Modal Split	3,2 public transport : 66,8 private vehicle
4	Travel Cost	32.556.523 IDR.km.veh/hour

2012

Source : Author, 2013

Table 5.1 above shows us that overall, BOCIMI road network performance has decreased after decentralization system. Average speed on the network has decreased for 27,02%. This degradation was caused by the increasing of volume of vehicle without followed by infrastructure development. Consequently, traffic density increased. Surely the increasing of density causes the increasing of traffic delay and queue. Deceleration increasing emerges the increasing of travel time, energy consumption, and travel cost. Because of road network degradation, energy consumption was increased 25,70% and travel cost increased for 242,48%. In this case, travel cost increasing become the most prominent changes. This

condition also caused by economic crisis which happened in Indonesia since 1998. The value of rupiah decreased and all of primary needs became more expensive, included vehicle operation cost. In between the increasing of travel cost, modal split did not change too much. Ratio between public and private vehicle use are still constant. It means that there was no travel behaviour changed in society to choose public than private vehicles before and after decentralization.

From the explanation before, we can summarize that there are many factors which are influence the decreasing of road network performance that empirically has explained by comparative analysis. In theoretical framework, institutional system and its procedure, regulation, also path of communication are included as important factors to increase road network performance. In this decentralization era, many actors who are involve in the circle of system. Their interaction become more complicated and influences the physical performance of road network. The complicated interaction and how it can implicate road network performance will be elaborated in **chapter 6**.

5.2 Descriptive Analysis: Current Condition of BOCIMI Road Network Regarding Sustainable Mobility Indicators

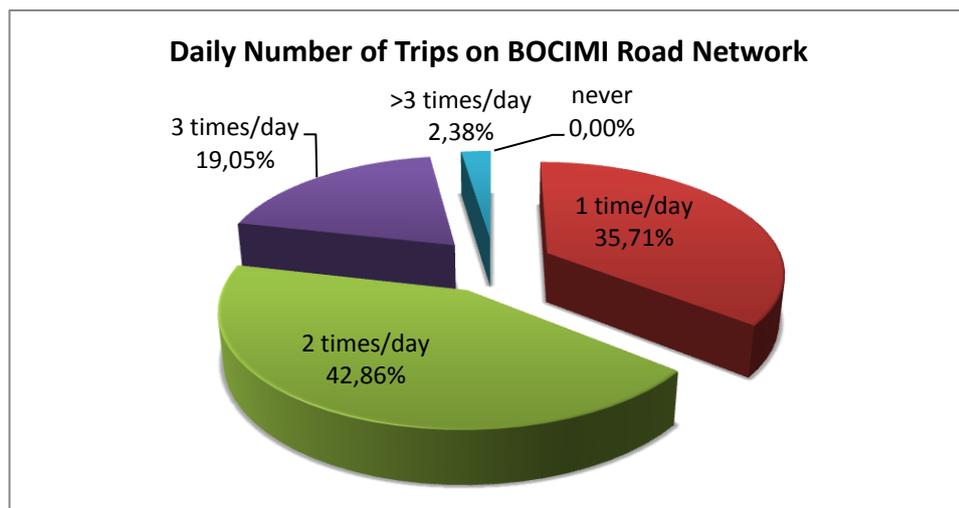
Descriptive analysis is arranged to describe BOCIMI road network performance based on road user's experiences, which are measured by sustainable mobility indicators (as explained on **table 4.1**). The users of this analysis are defined into two parts: society and industrial community. Government and NGO's opinion about sustainable mobility are included in this section. To make the analysis more concrete, each indicator of sustainable and mobility will be divided. Sustainable dimension consists of environment, economic, and social variables. Mobility will be described by daily number of trips, average travel time, average speed, and average trip length. In the end of this section, correspondence between each dimension will be explained.

5.2.1 Mobility Dimension

Mobility shows the degree of physical movement on BOCIMI road network. Mobility can be analysed by demand side, especially from road user's experiences. Relates with their explanation about the importance of integration

between place and space, Docherty et al (2008) argued that individual's level of mobility can show us the degree of transport infrastructure's performance. Further, Black (2003) explained this mobility degree as demand flows which are transported in the network. Higher road performance is marked by higher physical movement on that network per determined unit time. In this research mobility degree will be described as number of vehicle's movement on BOCIMI road network, their average travel time, and also their average speed.

Based on survey result, the highest daily percentage of trips of road users is 2 times/day (42,86% of road users). This number indicates that the mobility on BOCIMI road network is dominated by return movement, and the most possible of characteristics movement are home based mobility. They go to do their activities and fulfil their needed, and back to home. High percentage of the users who do their trip for 1 time/day (35,71%) indicates that many road users do internal-external trip and external-internal trips, use BOCIMI road network to reach the other cities, like its function as national road network (explanation in **section 3.2**). The long length of BOCIMI road network causes less number of road users who do their trip more than 2 times/day. This reality can be reasonable when they should drive in the long length network with limited speed and long travel. Consequently, they can spend more times for once trip, and finally their mobility number are limited also.



Picture 5.2 Percentage of Road User's Daily Number of Trips on BOCIMI Road Network

Source : Empirical Data, 2013

Similar condition is happened in freight transport case. They move on BOCIMI road network average once a day. This number of movement relates with supply chain of production and distribution process. The factory usually gets raw materials from the other area BOCIMI, and also distributes their product to the other area. In the other words, the most mobility of freight vehicle is internal-external movement or external-internal movement.

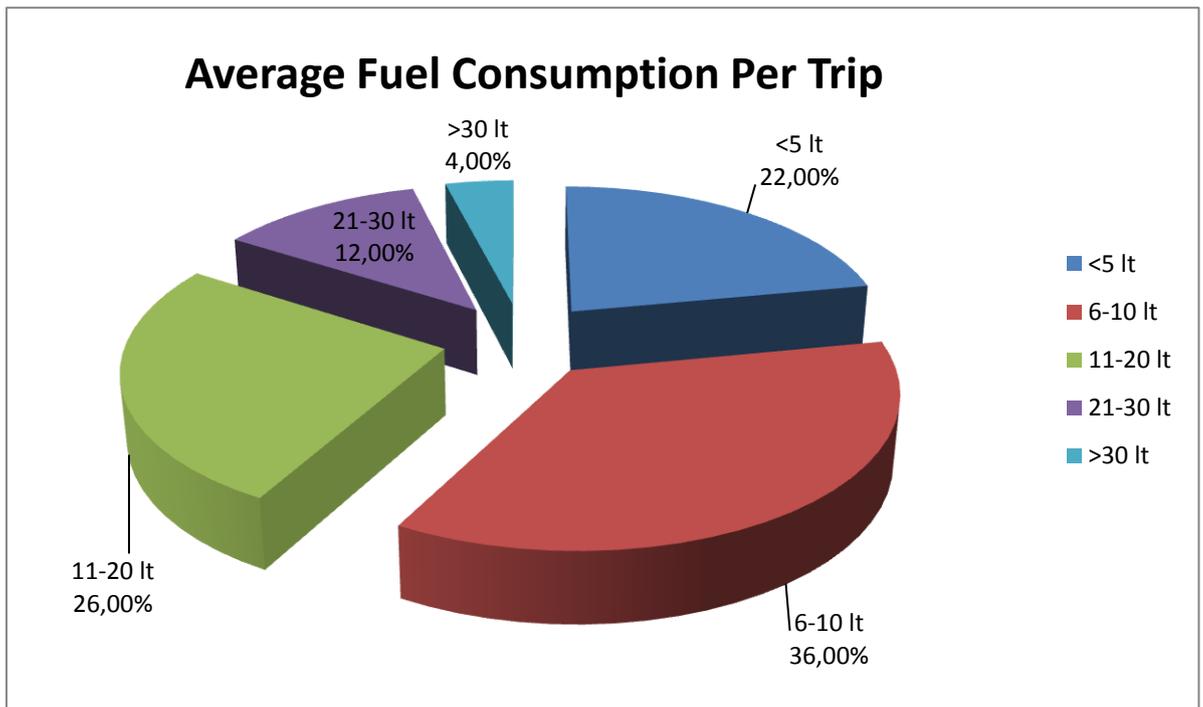
5.2.2 Environment Dimension

Relates with sustainable mobility concept, definitely mobility case should be relates with environment, economic, and social aspects. This section will explain environment matter, especially in fuel consumption of road users. Obviously the pollution which sparked by vehicle movement are relate directly with fuel consumption of those vehicle. Potter & Bailey at Knowles et al (2008) explained the LCA (Life Cycle Analysis) as a method to evaluate the environmental aspect in transport system, and they agreed that energy uses become important point to start evaluation analysis. The impacts of mobility to environment not only affect direct air and noise pollution, but also they affect the second order impacts, like lifestyle health, activity patterns, land use effects, globalization, and air travel (Potter & Bailey, 2008, p.35-37).

Nowadays, environmental issue becomes global agenda to be solved. Decreasing amount of non-renewable energy causes the people have started to develop new technology to use renewable energy for mobility. Besides that, demand side also become important since mobility always increase year by year. Indonesia as a part of international matter, should realize about this issue. One of the busiest networks in Indonesia is BOCIMI road network, because of that, the government need to concern to decrease demand side of fuel consumption, included demand on this network.

Based on survey result, most of the road users spend 6-10 litres of fuel per trip to move on BOCIMI road network. If we relate with last data about mobility, most of the people do 2 trips per day, we can assume that they spend approximately 12-20 litres of fuel per day. Related with average length trip, most of respondents spend 2,67-4,5 km/litre. Less vehicles spend more than 30 litres of

fuel per trips (4% of road users). This fuel consumption also influenced by traffic condition. Higher traffic density generates more pollution, because idle vehicle will need more fuel consumption and spare more pollution. Percentage fuel consumption of road users on BOCIMI road network can be seen on **picture 5.3** below.



Picture 5.3 Percentage of Fuel Consumption per Trip by Road Users on BOCIMI Road Network

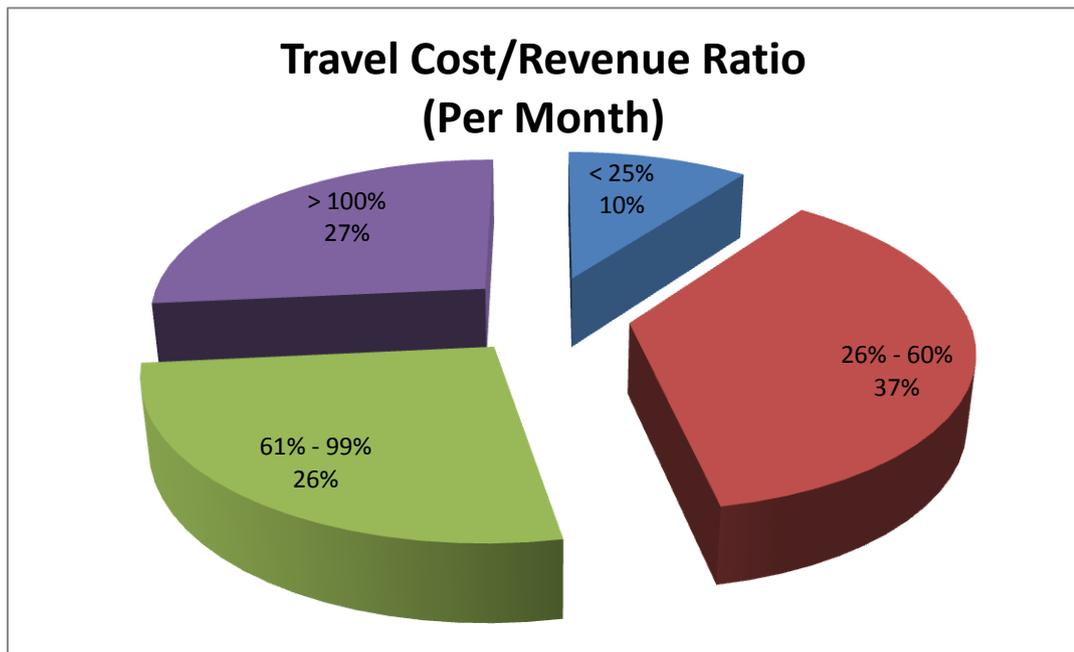
Source : Empirical Data, 2013

5.2.3 Economy Dimension

The main reason of mobility increasing is development of economic activities and economic needed. Because of that, many transport policy are evaluated by using economic dimension. They counted the economic value of transport policy, both for society also for financial matter. MacKinnon et al on Knowles et al (2008) analysed the relationship between transport and economic development. They realized that poor countries have worse transport availability, use, and investment. From that example they conclude that transport become one of crucial thing to develop economic condition in country. However, the benefit

of transport policy should be considered as a bridge to increase the economic activities and finally improve the economic welfare of the people.

Efficiency is important part in economic concept. The people try to get maximum economic benefit by using minimum resources. This principle also can be used in transport case. Transport policy can be seen as efficient policy if the users can get financial benefit, as the impact of that policy. Financial benefit from each user will be amount as economic development of region, and globally will be valued as country's economic development. Relates with mobility concept that focus on perceived performance by road user, further this section will analyse the perceived efficiency of BOCIMI road network which described as the ratio between travel cost and revenue per month.



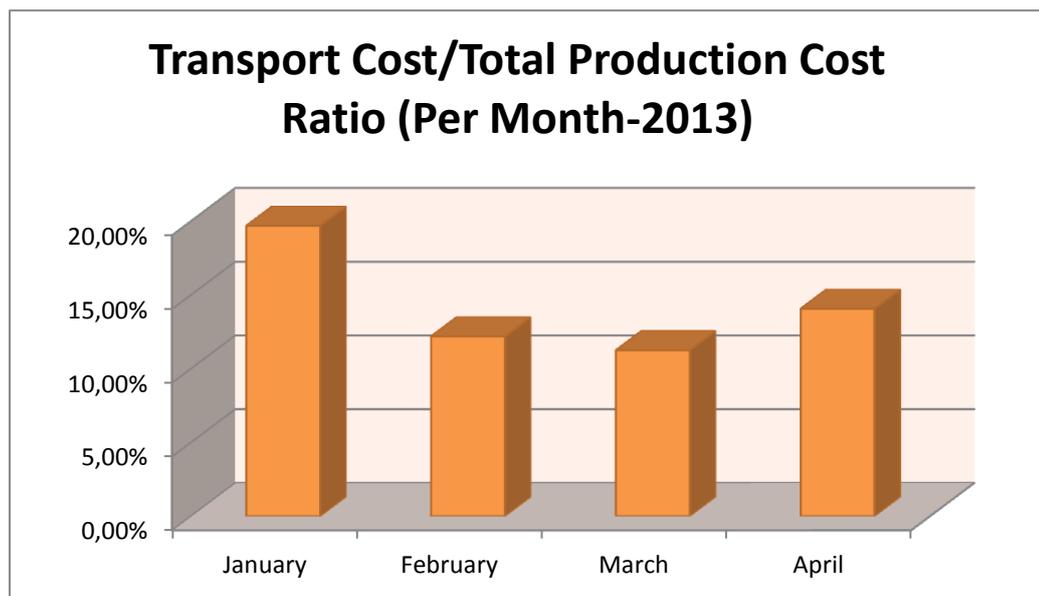
Picture 5.4 Percentage of Travel Cost/Revenue Ratio of Road Users on BOCIMI Road Network

Source : Empirical Data, 2013

Most of the road users spend 26%-60% their revenue to travel on BOCIMI road network. Certainly this value doesn't show that BOCIMI network provide efficient road service. More than half their revenue are used for mobility. Whereas, there are many others primary needed that should be fulfilled by the people. The worst thing is high percentage of road users who need more money to

travel because their transport cost more than their revenue. This reality can be a reason why Bogor and Sukabumi are hard regions to be developed although both cities have many resources.

Inefficiency of transport cost is also perceived by manufacturer. Average transport cost per total production cost is 14,30%. This value increases when peak period, because traffic density was culminated and it generated more fuel consumption and finally increased travel cost.



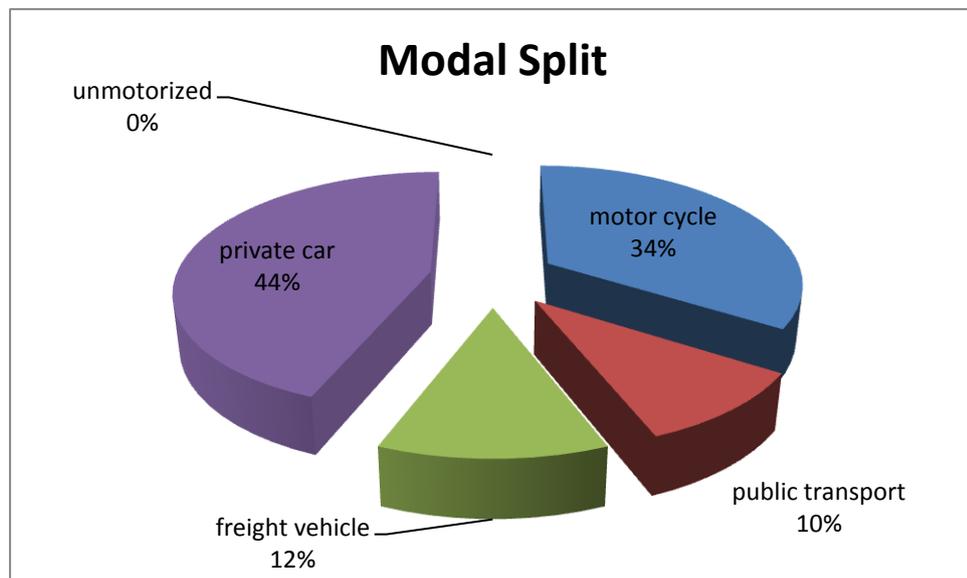
Picture 5.5 Percentage of Transport Cost and Total Production Cost Ratio of Manufacturer on BOCIMI Road Network
Source : Empirical Data, 2013

Picture 5.5 above shows us the highest transport cost of manufacture was occurred on January (19,69%). The high of this value caused by the high of traffic density on BOCIMI road network because of this month is peak period for holiday. Usually in this period, more internal-external, external-internal, and external-external mobility occurred on BOCIMI road network.

5.2.4 Social Dimension

Hine at Knowles (2008) argued that transport policy should be realize about social justice, like decrease social exclusion by promote modal shift from private vehicle to public vehicle, walking, or cycling. As the explanation in **section 5.1**,

there is no significant change in modal split before and after decentralization. Road users more prefer private car than public transport.



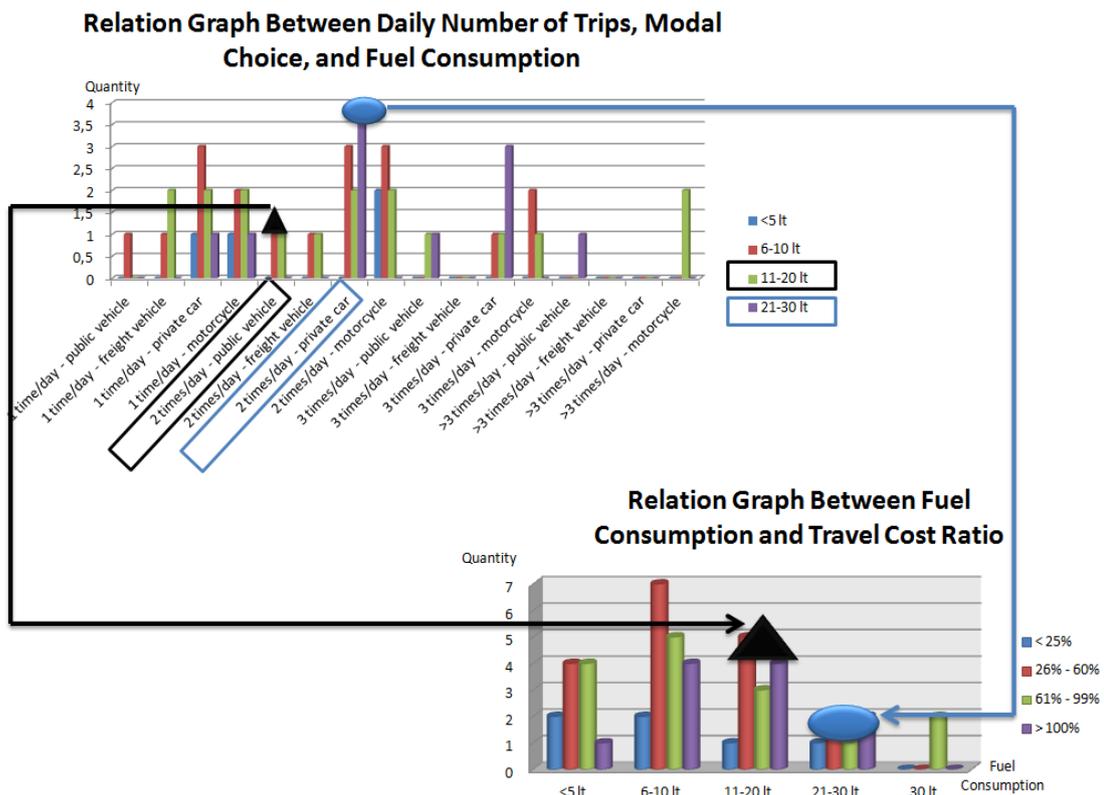
Picture 5.6 Percentage of Modal Split on BOCIMI Road Network
Source : Empirical Data, 2013

Based on description on **picture 5.6**, 44% of road users prefer private car and also high percentage of motor cycle's users (34%). This circumstance not only occurs in BOCIMI road network, but also in almost road networks in Indonesia. Market's speculation and leniency of government's policy to allow private vehicle ownership, included motorcycle, supported the booming of private vehicle uses. Worse performance of public transport also causes less public transport uses (10% of road users). This condition is completed by less awareness of society about environmental issue, road performance, and the importance of public transport uses.

There is no people who uses un-motorized vehicle, because most of them do long trip, between 16-45 km (explanation in **section 5.2.1**). Besides that, generally Indonesian people don't interest to use un-motorized vehicle. Besides the contour, topography, and less road facilities for un-motorized vehicle; culture and prestige factors also influence the less of un-motorized uses.

5.3 Correlation Description Between Sustainability and Mobility Concept

As the explanation in **chapter 2**, the raising of transport demand generates more effects, particularly external effects that can be perceived by the people indirectly. To ensure those effects won't injure future generation, mobility analysis could not be divided with sustainability issue. The raises of environmental problem, economic development issues and social discrepancy, require the government to include sustainability concern in their mobility policy. Further, sustainable mobility need to be analysed as systemic matter. Because of that, the correlation description of sustainable mobility in BOCIMI road network will be explained in this section. Current survey result in BOCIMI road network (**picture 5.7**) tries to correlate the number of trips, modal choice, fuel consumption, and travel cost ratio.



Picture 5.7 Relation Graph Between Daily Number of Trips, Modal Choice, Fuel Consumption, and Travel Cost Ratio
 Source : Empirical Data (2013)

Based on survey result, the highest daily percentage of trips of road users is 2 times/day. Most of them use private car and generally they spend 21-30 litres fuel to do their trips. Although the trip frequency of private car and public transport almost same, but the number of private car users are higher than public transport users. Consequently, BOCIMI road network has high traffic density and overall they generate more emission. This result can be compared with Yogyakarta Southern Ring-road that has the same road function with BOCIMI road network. Average road users usually spend 6-10 litres for 2 trips (Yogyakarta Province Transport Agency, 2012). This comparison also based on V/C ratio each road network, where BOCIMI has higher V/C Ratio than Yogyakarta Southern Ring-road. It means that BOCIMI road network is unfriendly network with environmental aspect. Additionally, the environment effects are influenced by road density.

The other data shows that the average of fuel consumption of public transport is less than private car (11-20 litres/day). It means that actually public transport is more efficient than private car, saver un-renewable energy, has more occupancy and further they generate less emission than private car do. If we linked this result with Banister's (2008) research about sustainable mobility paradigm (**section 2.1.1**), very appropriate if he required modal choice shifting as one of important matter to reach sustainable mobility. This shifting relates with travel behaviour (ex: modal choice) and technological innovation to increase the vehicle efficiency. The relationship between those data and theory could help us to deduce that public transport uses could be a choice to increase the sustainable mobility realization.

The comparison result between private car and public transport uses shows that public transport spends less fuel than private car, and the travel cost ratio (ratio between travel cost and revenue) of public transport is higher than private car users. It means that private car more economical than public transport in BOCIMI road network. This reality can be a reason why the people more prefer private car than public transport.

Travel cost is determined by its component and it depends on government's policy. Novianingsih (2009) did a research about the relationship between public

transport's performance, municipal's policy and public transport quality which are considered by users in Sukabumi. The result showed that municipal's policy has strong influence to public transport quality. That research also divided policy's variable into two reflected variables: tariff and accessibility of the route. High travel cost of public transport and low accessibility of the route can show that socially the people don't get their right: adequate public transport facilities. It could be concluded that if the municipality wants to increase the public transport uses, they should review those two variables.

Fuel consumption of freight vehicle is more than public transport. They spend average 11-20 litres fuel for once a day movement on BOCIMI road network. For this value, the factory should improve their technology of freight vehicle to get more efficient fuel consumption. Most of the factory doesn't give more subsidies for transport to their worker. They also don't provide employee bus or the other car with higher occupancy to accommodate their workers. This actual condition shows that socially the employees don't get their right: transport facilities.

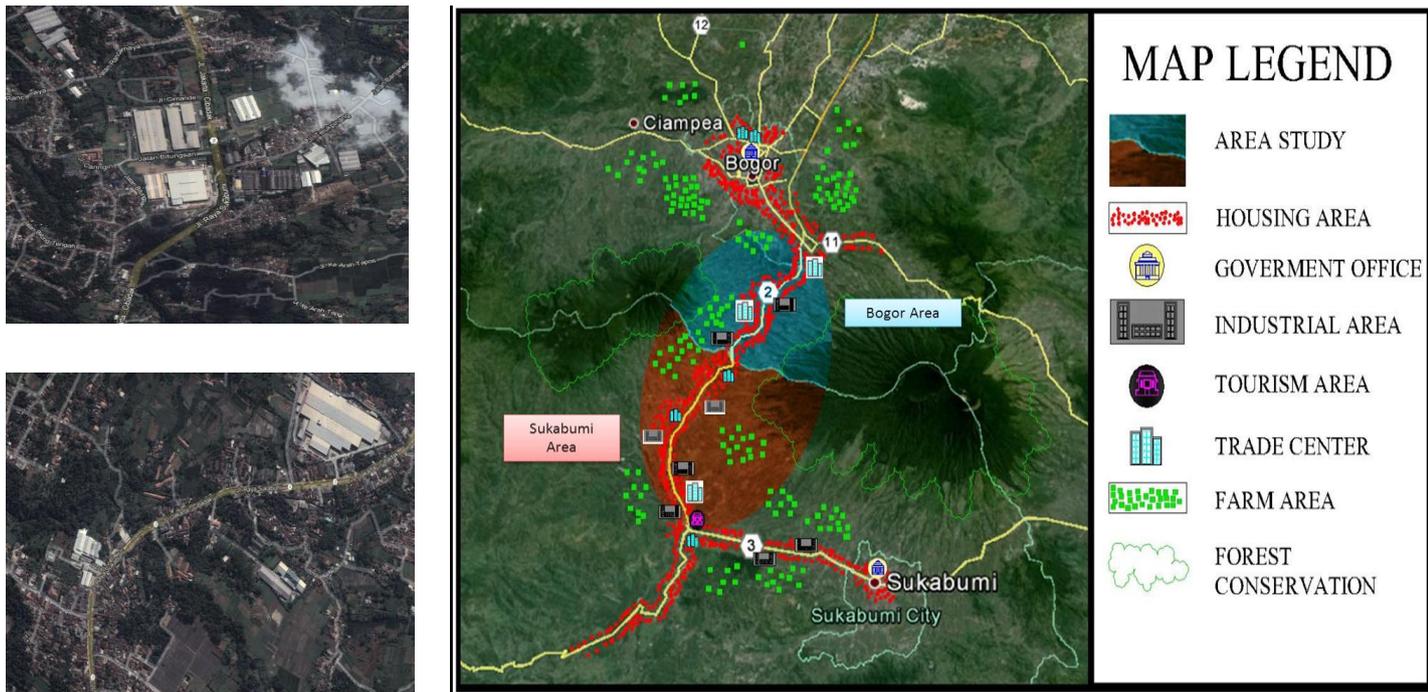
5.4 Land Use Pattern in BOCIMI Area and Its Correlation with Sustainable Mobility Indicators

5.4.1 The Current Land Use Pattern in BOCIMI Area

Chapter 2 (see **section 2.2.2**) explicitly has explained the importance of land use and transport integration for sustainable mobility. The degree of its integration influences modal choice to travel, and finally generates the external effects of the movement from social, economic, and environmental concern. Specifically, **section 3.1** explained the land use authority in decentralization system. Land use planning is implemented by local government with national government's supervision. Province government has important task to facilitate the cooperation and communication between local government. Unfortunately, this scheme doesn't work in practice. Less supervision, and high interest of land use development caused the messyness of land use pattern in BOCIMI.

This section will explain the current condition of land use pattern in BOCIMI area, and its relation with sustainable mobility. **Picture 5.8** below shows us the land use pattern in BOCIMI area. Housing areas dominate land uses beside

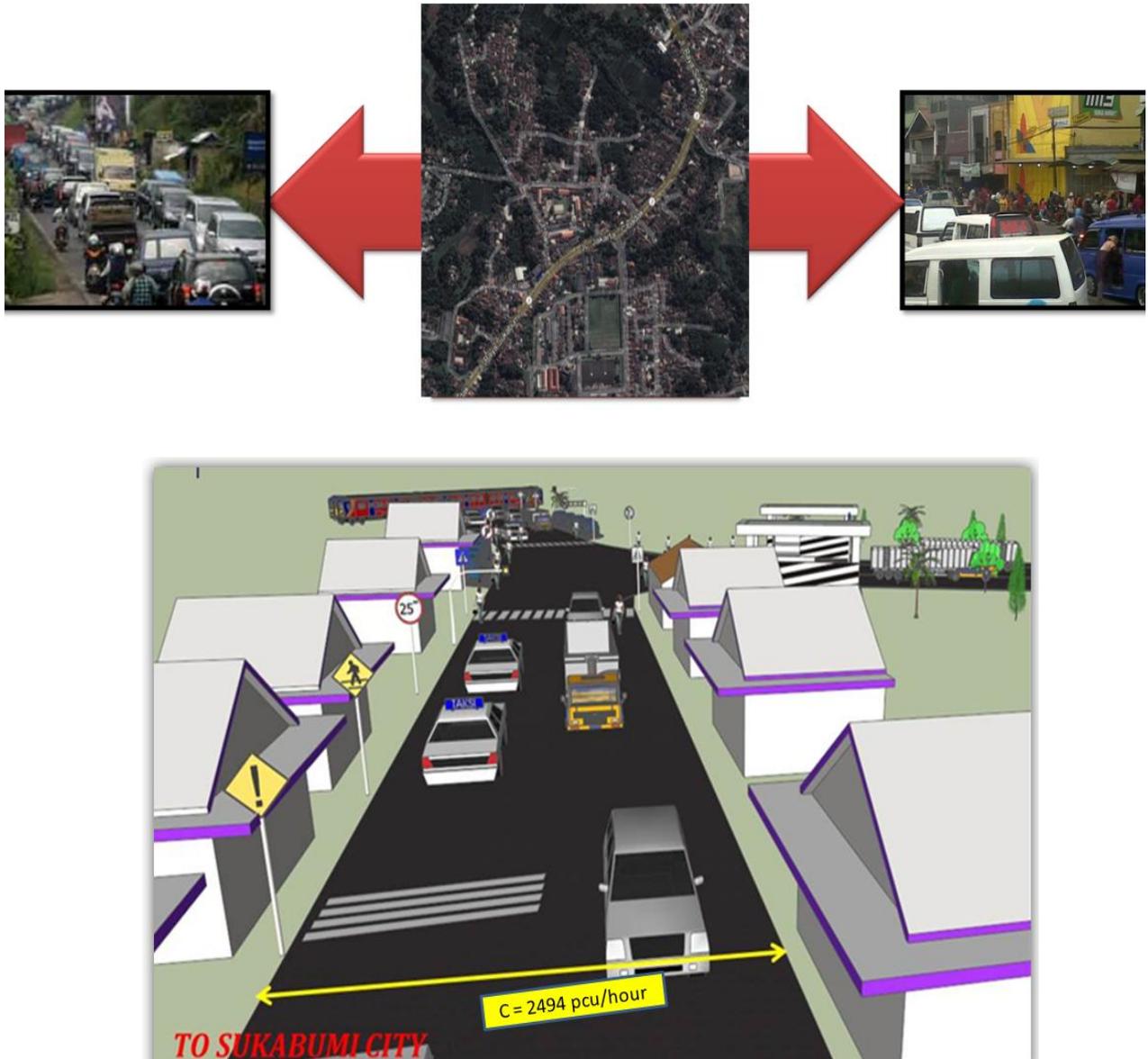
BOCIMI road network. This land uses also mixed with several big industrial area and crowded trade centres. One big tourism area also held on the borderline of Sukabumi City and Bogor City. Farming area and forest conservation are located spreadly in BOCIMI area, far from road network, but the distribution activity also utilize BOCIMI road network.



Picture 5.8 Land Use Pattern in BOCIMI Area
Source : Empirical Data (2013)

Various and the high number of activities beside BOCIMI road network contribute the decreasing of road network capacity. This statement is supported by analytical guidelines from Manual Road Capacity of Indonesia (1996) (see **section 2.1.1**). This theory also can be applied on BOCIMI road network. More activity will decrease the broad of road network and finally decrease the road's capacity. BOCIMI road network has basic capacity 2900 pcu/hour, but because of the high number of side barriers, current road capacity is 2494 pcu/hour (AQUA Report, 2012) (**picture 5.9**). This condition is combined by more delay that will be happened in more land use activities. As the consequence, the deadlock in

traffic congestion, lower road network performance, higher external effects are occurred on BOCIMI road network.



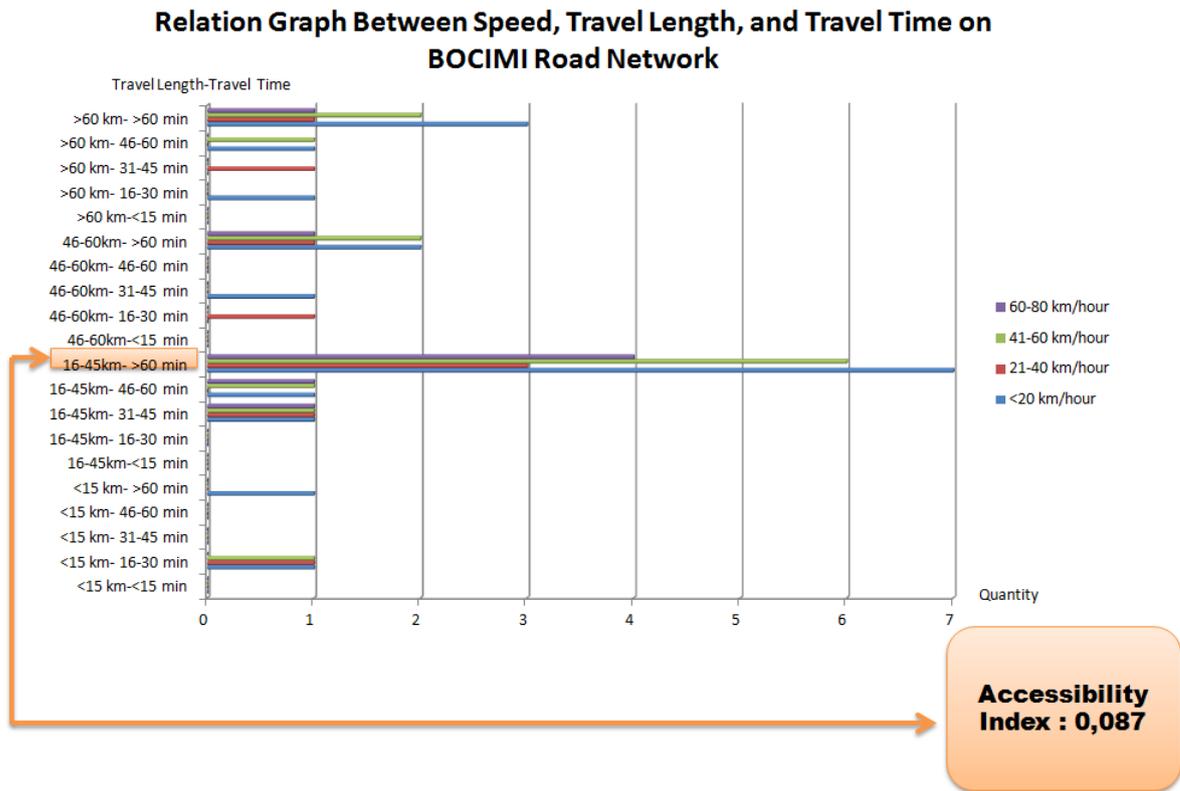
Picture 5.9 Land Use Pattern and Road Capacity in BOCIMI Area
Source : Empirical Data (2013)

5.4.2 The Correlation Between Land Use Pattern and Sustainable Mobility Indicators

Berke et al (2006), Wilson (1974), Kenworthy&Laube (1996), Beatley (2010) and Banister (2008) (see **section 2.1.1**) agree that integration degree between land use pattern and transport contributes the successful of sustainable mobility realization. Land use pattern refers to the availability of facilities that are needed by the society. The integration between land use and transport indicates that the increase of accessibility will be occurred if there are more mobility resources (Docherty et al, 2008,p.85).

To measure the integration between land use and transport system, Nicolas et al (2003) in **section 2.1.2 (table 2.2)** introduced velocity, travel time and length of trip variables as the representatives. These indicators are taken for this thesis and relates with the ability of BOCIMI network to accommodate the mobility of people and goods. As a part of spatial system, BOCIMI network is one of access to reach one or more places to fulfil the needs of each person or industry importance. Because of that, this network should be integrated with the origin and the destination places.

In 2001, National Government by Ministry of Public Work arranged road minimum service standard based on technical survey and society expectation about road service. This draft will be determined as technical standard regulation of road network performance in Indonesia. In this draft, they specify that minimum average velocity on primary roads, like BOCIMI road network is 25 km/hour (Public Work Ministry, 2001). They also assigned accessibility index (km/km^2) as ratio between length of road and wide of catchment area. They compared this accessibility index with population density in catchment area. For this research, BOCIMI as a part of Sukabumi and Bogor has average population density 2388 persons/ km^2 (Indonesia Statistic Agency, 2012). Minimum service standard suggests for areas which have >1000 persons/ km^2 density should be completed with accessibility index more than 1,5. It means that the network should be minimum 1,5 km length for 1 km^2 area.



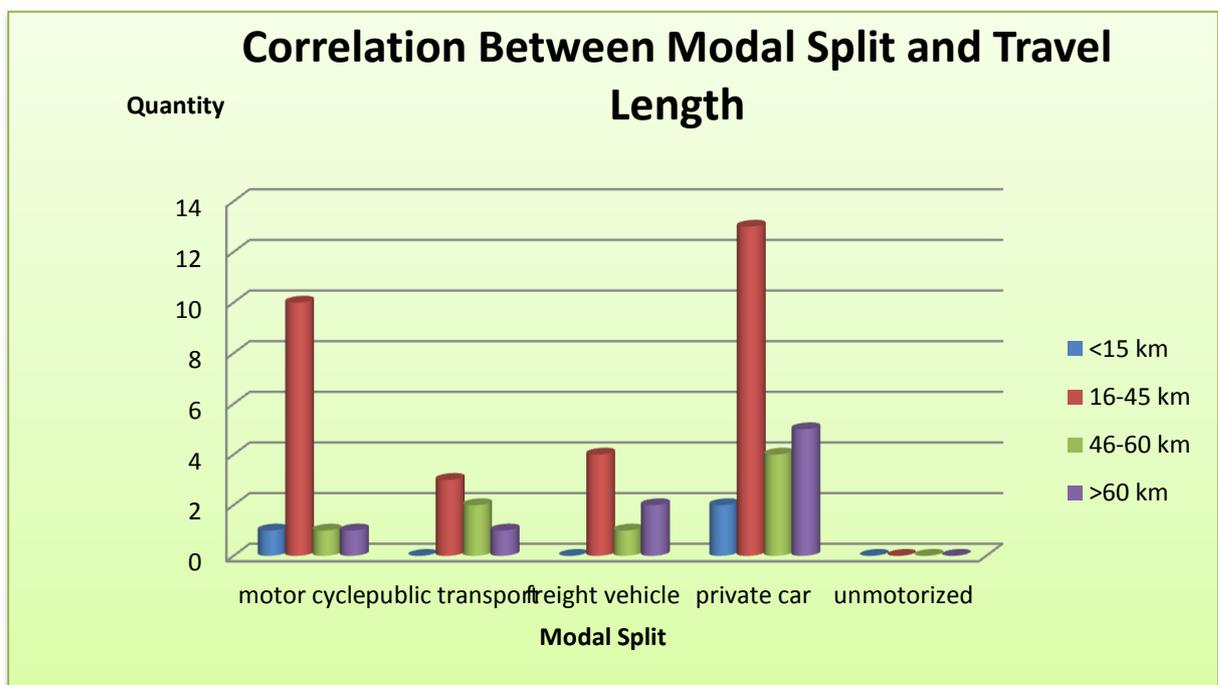
Picture 5.10 Relation Graph Between Speed, Travel Time, and Travel Length on BOCIMI Road Network and Its Relation with Accessibility Index

Source : Empirical Data, 2013

Picture 5.10 above shows us the real condition of accessibility on BOCIMI Road network. Catchment area of BOCIMI Road Network has 697 km² wide and the length of BOCIMI road network is 61 km. By accessibility index of BOCIMI for 0,087 , the road users have to spend more than one hour to travel for 16-45 km. Most of the users in that condition drive their vehicle less than 20 km/hour. If we compared with the ideal value, certainly we can conclude that BOCIMI road network has worse accessibility, poor integration with land use pattern.

As the explanation from Miller (2004) with his integrated urban modelling system framework (see **Picture 2.2**), land use pattern determines the location choice, and together with auto ownership, they influence the activity and travel quantity. This activity generates traffic flow, travel time, and the external impacts which can be analysed as sustainable mobility indicators. Relates with data which are used in this thesis, travel length as representative of integration degree between land use and transport, will be correlated with each dimension of sustainable concepts : environment, economic, and social dimension.

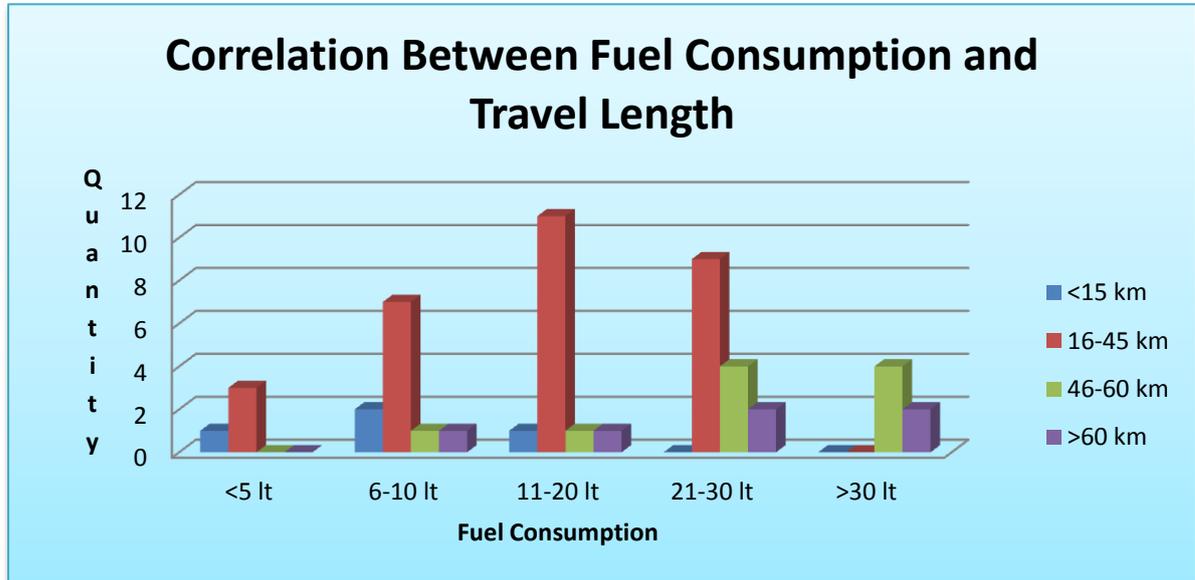
Social dimension can be analysed from modal split. As Miller’s framework, land use pattern can influence the auto ownership and modal split of road users. For this case, most of the road users use private car and motor cycle. More travel length generates the increases of private car. **Picture 5.11** below shows that more people choose private car to travel more than 60 km than public transport. Most of the people do their trip for 16-45 km by private car with low index accessibility (**Picture 5.10**). The other data shows that they still prefer private car and motor cycle to travel less than 15 km. This phenomenon emerges the awareness that there are the other factors that influence modal split, like behaviour, culture, and the other factors.



Picture 5.11 Relation Graph Between Modal Split and Travel Length
Source : Empirical Data, 2013

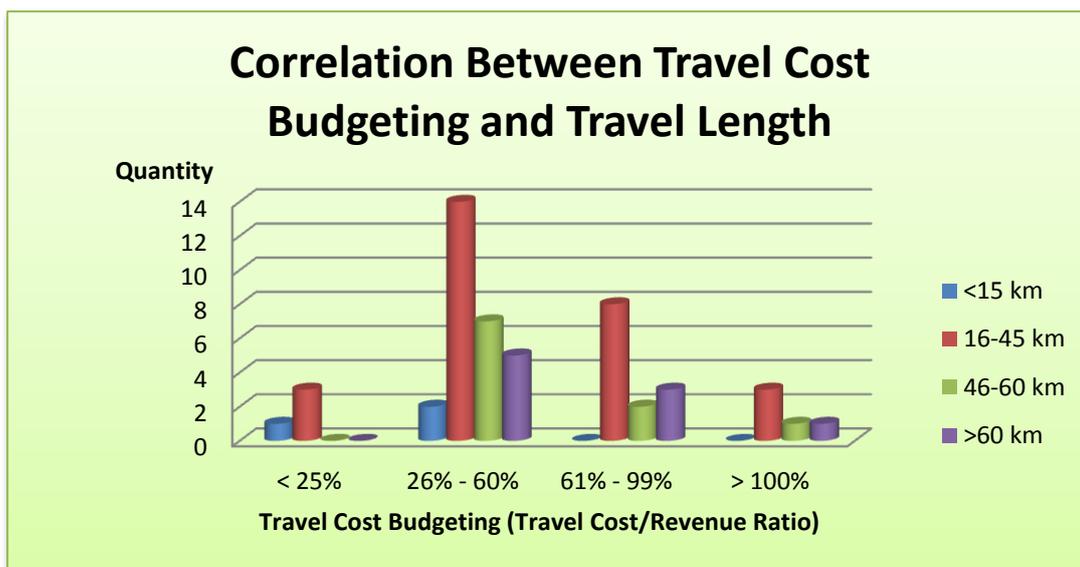
The high number of private car users stimulates the higher change in traffic density increasing. As the consequence, the external effects from environmental and economic dimensions of travel also increase. This statement also strengthens by Miller’s framework that explains the external effects as the consequences of activity and travel. Consistent with previous analysis about sustainable mobility

indicators, environment dimension will be represented by fuel consumption and economic dimension will be described by transport cost and revenue ratio.



Picture 5.12 Relation Graph Between Fuel Consumption and Travel Length
Source : Empirical Data, 2013

In the manner of low accessibility index, most of the road users do their trip 16-45 km and they spend 11-20 litres of fuel. Generally, more travel length will need more fuel consumption. As the example, **Picture 5.12** above shows that they need to spend more fuel to travel more than 60 km. But, that picture also shows a phenomena when higher fuel consumption is needed for lower travel length. This phenomenon can be caused by traffic jam with low velocity but higher fuel consumption. Description about that phenomenon indicates that low accessibility index together with modal split can cause traffic jam; more fuel consumption needed and finally will generate more pollution as external impacts for the environment.



Picture 5.13 Relation Graph Between Travel Cost Budgeting and Travel Length
Source : Empirical Data, 2013

The low of accessibility index also caused the high of travel cost degree that represented by ratio between travel cost and revenue. A few number of road users who travel less than 15 km and spend less than 25% of their revenue to transport cost. Higher travel length averagely needs more travel cost budgeting. They can spend 61%-99% of their revenue to travel more than 60 km. Furthermore, some road users can spend more than their revenue to travel 16-45 km. Similar with environment's case, this circumstance can be happened because the high number of traffic density, as an effect of modal choice by road users.

5.5 Concluding Remarks

Theoretical background in **chapter 2** has explained about the failures of decentralization system. Lacking of coordination between each actor in multilevel governance becomes main issue in this system (Hudalah et al,2013). Further, **chapter 3** also explained that decentralization system in Indonesia, especially in BOCIMI road network implicates the fragmentation in land use and transport planning.

In order to answer the first research question, this chapter explained the current performance of BOCIMI road network, its integration with land use pattern and the comparison result before and after decentralization. Based on

descriptive and comparative analysis, the result can be concluded as following points.

- a. Degradation of road network performance was happened in BOCIMI road network before and after decentralization era. This degradation can be seen from the changed in sustainable mobility indicators. Average network velocity is decrease after decentralization. This velocity decreasing generates the increasing of travel cost and energy consumption.
- b. Land use pattern in BOCIMI area consists of various and high activities. Those activities increase the side barriers, and finally contribute the degradation of road capacity.
- c. Road users in BOCIMI road network have low mobility degree; most of them can drive on BOCIMI road network just 2 times/day. This condition can be caused by the high density of land use pattern in BOCIMI area which contribute to the degradation of road capacity and increase the volume/capacity ratio. The increasing of V/C ratio will enhance the travel time and finally restrain people and freight movement per day.
- d. The high density of land use pattern besides BOCIMI road network can't be balanced by development of transport system. Consequently, this road network has low accessibility index, far away from minimum standard that is determined by National Government.
- e. Land use pattern can influence modal choice of road users. Nevertheless, the influence of land use pattern not too big in modal split contribution. This statement can be proven by the high number of private vehicle uses in short length trip. Modal split in BOCIMI road network is dominated by private vehicle, both private car and motorcycle. 78% of road users use private vehicle to transport on BOCIMI road network. In this case, behaviour, culture, and the other external factors can contribute the modal split of road users.
- f. The increasing of private vehicle uses and high land use activity besides road network cause the increasing of traffic density. Consequently, the external effects of traffic flow also increase. BOCIMI road network requires high

travel cost for its users. Most of users should spend their 26%-60% of their revenue to move on BOCIMI road network.

- g. Besides from economic effect, the external effects also can be seen from environmental matter. BOCIMI road network can be included as unfriendly-environment road network, because it needs more fuel to move in BOCIMI road network than in the other road network where has the same road function, likes Yogyakarta Southern Ring-road.

Relating sustainable mobility indicator in the explanation above, decentralization has contributed to disintegration between land use and transport; and changed BOCIMI road network performance. Policy fragmentation in decentralization era causes un-integrated planning between land use and transport system; and finally obstruct sustainable mobility realization in this network.

Chapter 6

The Implications of Decentralization System for BOCIMI Road Network Performance

“Decentralization system conduce lack of coordination mechanism in multilevel governance, especially in case to make integrated planning between land use and transport”

Indonesian Ministry of Transportation, 2013

In **chapter 2** we have analysed that institutional arrangement also have an important role to influence the road network performance, including the integration between land use and transport system. **Chapter 3** also explained that the change of governmental pattern from top-down towards decentralization in Indonesia influenced the change of BOCIMI road network performance, relates with its function as national road. To make this research more concrete, this chapter will explore what the implications of decentralization system for BOCIMI road network performance are regarding with sustainable mobility matter which has been explained in **chapter 5**. Complex interaction between stakeholders in new era will be elaborated by means of the problem structuring method (**section 6.1**), and will be correlated with empirical data in **chapter 5 (section 6.2)**.

6.1 Problem Structuring For BOCIMI Road Network Trough Soft System Methodology

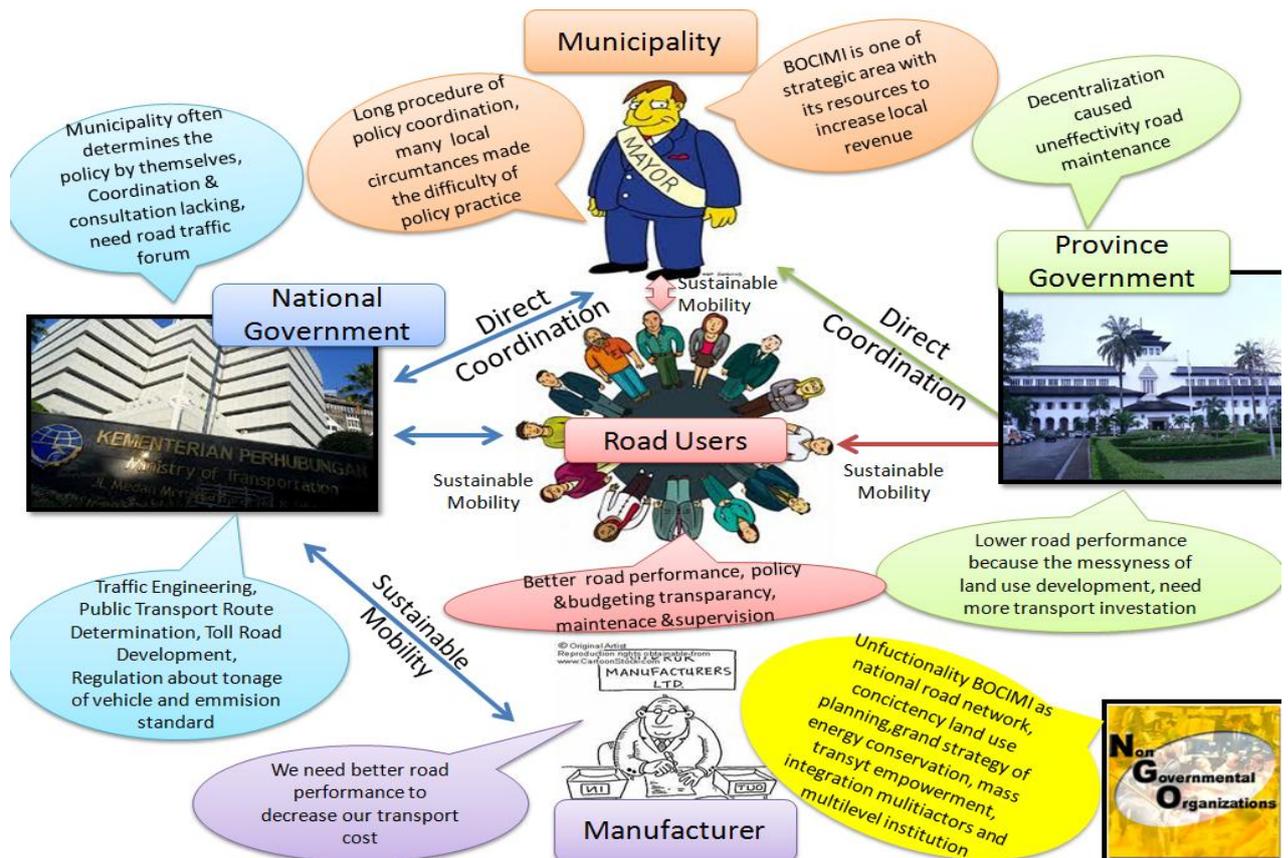
Development of scientific research about regional planning has increased the awareness of planners to pay more attention to uncertainty matters. This development is followed by the consideration that world is not change certainly, but it change dynamic and can't be assumed as linier pattern. As the consequence, technical rationality has developed towards communicative rationality. As we have known that communicative rationality requires participation process of various stakeholders, and it can be stimulate more complexity degree in planning arena. De Roo (2000) explained that this complexity rises because there are

multiple stakeholders who have different interest with each power to take the decision should be involved in planning arena.

In this thesis, transport demand can be described as unpredictable context; the social changes contribute the difficulty of transport demand forecasting. Decentralization system also requires more actors to be involved in BOCIMI road network planning. The uncertainty and higher participation make planning process becomes more complex. However the high degree of complexity, we need to arrange the problem structure about it. Soft System Methodology is one of right method to structuring the complexity problem in BOCIMI road network relates with the changes in decentralization era. As the explanation in **chapter 4**, SSM focuses on organized relationship between stakeholders and their interaction which is divided into 7 steps analysis. For this case, those 7 steps are simplified into six steps. The explanation about SSM analysis can be seen below.

6.1.1 Stages 1 and 2 : The Problem Expression and Rich Pictures

The analysis begins with the problem expression that will be described by rich picture. This rich picture is a result of interview from various stakeholders and regulation analysis. This picture is useful to describe what a complex interaction between stakeholders who are involving in sustainable mobility realization of BOCIMI road network. The rich picture of BOCIMI road network problem can be seen by **picture 6.1** below.



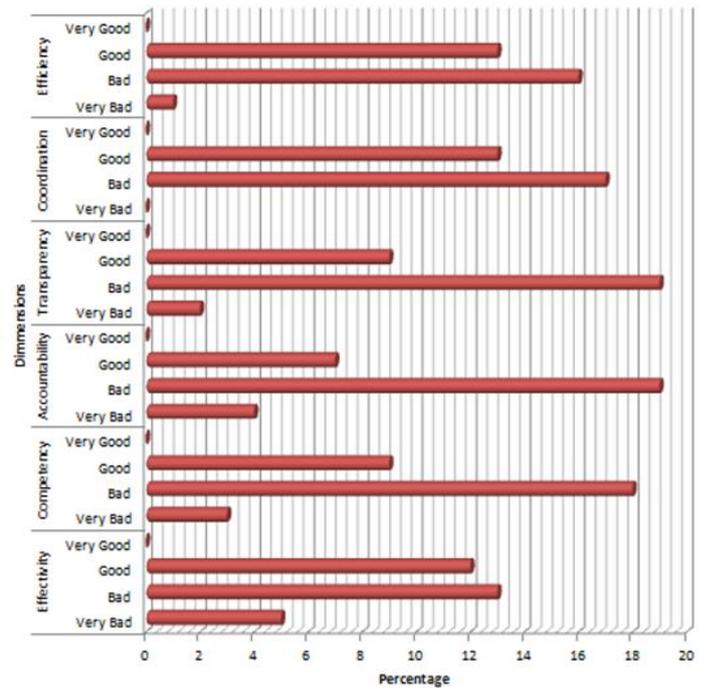
Picture 6.1 Rich Picture of Case Study
Source : Author analysis, 2013

The rich picture above indicates inter-relationship among stakeholders. There are six main stakeholders who are involved in this case: National Government, Province Government, Municipality, Manufacturer, Road Users, and Non-Governmental Transport Organization. Each stakeholder has own interest and viewpoint. Nevertheless, based on interview result and some regulations which have explained in **chapter 3**, they have the same big goal: increasing BOCIMI road network performance to support the sustainable mobility realization. This goal was generated by encouragement from society who need better transport system, and also from global issues that more concern to sustainability matters. They also agree that un-integrated pattern between land use development and road network become a major problem that should be solved by all stakeholders involvement. The government, including national government, province and local government face more difficulty coordination since

decentralization system was enforced in Indonesia. Municipality made long procedure and local circumstances as reasons to not comply national and province government. That is why the NGO found that local government not consistent in land use pattern development. However, municipality still explore more resource in BOCIMI area to increase their local revenue.

The lacking of national and province government's supervision, both in land use and transport development made more messy condition in BOCIMI road network. NGO consider this lacking caused the function of BOCIMI road network has changed from national network become "grey national network" which legally as national network, but has characteristic like local road network. This problem also realized by the other road users, they need better road performance with good supervision and maintenance. Province government said that un-effective supervision and maintenance caused by the difficulty of decentralization system, which are relates with funding, coordination, and policy integration.

The same point has had by national and province government to improve BOCIMI road network performance. Adaptive way with the growth of activity and land use development. They programmes consist for BOCIMI toll road construction, traffic engineering mechanism, and traffic impact analysis of land use development. This plan also supported by road users. But in the other hand they will sell their land with high price for toll development, and this challenge is considered by local government as a constraint. If we related this phenomena with survey result which are explained public opinion about the performance of government in decentralization era, there is a possibility that the society have loosen their respect and trust to government. We can see in the picture below that most of the people gave "bad" value for government performance dimension. So, although they expect the increasing of road performance, but they didn't believe that government will do it well.



Picture 6.2 Public Opinion about Governmental Performance in Decentralization Era
Source: Author analysis, 2013

Different with national and province government, NGO has own opinion that the sustainable focus in BOCIMI road network not only in capacity concern, but also relates with travel behaviour, modal choice, and empowerment of the other mode which has more occupancy, like train. NGO gives more advices to empower the standard emission and periodic vehicle inspection as effective ways to increase the efficiency of energy and decrease the emission. Government need to design grand strategy of energy conservation which involve all stakeholders and integrated with the other policies.

6.1.2 Stage 3 : The Root Definition

The root definition explore the Client (C), The Actors (A), the Transformation (T), the *Weltanschauung* (W), the Ownership (O), and the Environmental constrain (E) of the system. The client shows the people or institutions who received the plan, the actors explains the parts of system, the *weltanschauung* indicates the point of view, and the environmental constrain relates with the other system that influence the planning system.

Table 6.1 CATWOE Analysis Applied to the BOCIMI Road Network

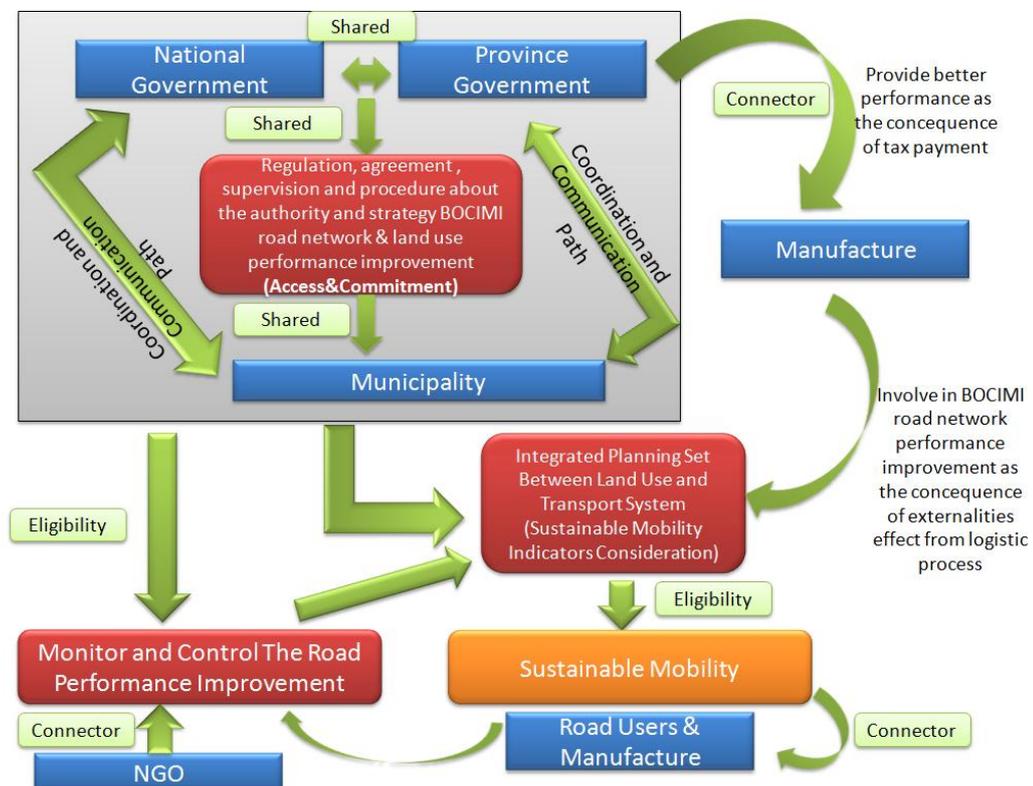
	Elements	Description
Clients	Road Users, Manufacturers	The person, or group, who benefit from the outputs of the system
Actors	National Government, Province Government, Municipality, NGO	<p>People that are part of the system and carry out its function. Based on the regulation, each actor has own responsibility in national road network management :</p> <p>a. National Government: arrange development planning of road network, maintenance and supervise the road network operation and land use implementation.</p> <p>b. Province Government: Facilitate the cooperation between local government</p> <p>c. Local Government: Arrange and implement detail land use policy and road policy.</p> <p>d. NGO : The NGO's responsibility doesn't contained explicitly, but they free to give the advice for land use and transport development</p>
Transformations	<p>Improve BOCIMI road network performance by fulfill sustainable mobility standard</p> <p>Actor's involvement in sustainable mobility realization</p>	<p>Integrate mobility policy in land use policy</p> <p>Coordination and communication pattern improvement between multilevel governance</p>
Weltanschauung	<p>BOCIMI road network has a big contribution in economic development and activity, so that's why better mobility is needed in this network.</p> <p>Environmental impact and energy issue become important consideration because traffic congestion in BOCIMI caused dissipation of fuel consumption and more environmental effect.</p> <p>Public transport facilities really needed to ensure the equity of mobility right for all of the people and help them to choose more sustainable modes.</p> <p>Decentralization system influences the hardness of sustainable mobility realization.</p>	The view point from which the system is being considered
Owners	National Government	Those who have the power to guide or support how the system performs
Environment	Funding constraint, travel behaviour, public trust to government, market or investor involvement, regulation.	Other systems with which the target system interacts and which impose constraints or pressures upon target system

Source : Author, 2013

Based on the CATWOE analysis above, we can see that a system is owned by national government. It means that national government has a role as a trigger in sustainable mobility realization in BOCIMI road network. Road users, including manufacturer need mobility to support their activity. Because of that, the actors: national government, province government, municipality also NGO need to develop an integrated policy between transport and land use. There are many the other systems which are influence the successful of sustainable mobility plan. Funding system, the changes of travel behaviour and culture, public trust to government, governance involvement also regulation take important function in this plan.

6.1.3 Stage 4 Conceptual Model

Conceptual model is arranged based on theory which have described in **chapter 2** and regulation that have explained in **chapter 3**. Collaborative attributes by Bertha (2009) are used to specify the lacking of decentralization system in order to realize sustainable mobility. Briefly, this conceptual model can be seen on the **picture 6.3** below.



Picture 6.3 Conceptual Model
Source : Author analysis, 2013

National Government within province government do their role to arrange the regulation about land use planning and integrate transport policy with its land use planning. Agreement between national government, province government, and municipality become important dimension to ensure that plan arrangement accommodate all multilevel institution interests. As we have known, that each level of government has own limitation, because of that this process also should be followed by resources and responsibility sharing between each level of government. Clear responsibility by standard operating procedure of this *shared* process also important to make sure that coordination and communication path will be effective and according by ideal path which are determined together.

Because of BOCIMI road network is a national network, as a consequence National Government need to supervise the realization of policy. To make sure the existence of equity principle in sustainable development, the *connector* body is needed. This connector body stimulates NGO and the other non governmental actors also take important part to monitor and control the development of land use and transport performance improvement. They can give advices to national government, province government, and municipality to complete the increasing of network performance in practice. This connector body also has the important task to make sure the effective of information flow about the importance of sustainable mobility realization to the road users, including manufacturers.

As we have known, that manufacture logistic activities contribute many external impacts. These impacts emerge more responsibilities of manufacture to give the transport compensation for society and involved in road planning arena. Stakeholder's involvement needs coordination and well communication path to increase the trust from society, so they want to give positive contribution for sustainable mobility realization.

Tools are also important in planning process. Both, technical and collaborative approaches need *access* to realizing the goals. Human resources and regulation become primary unsure in this attribute. Human resources and their interpretation about sustainable mobility can determine how far the goals will be achieved and how they will be achieved. Human resources can be legalised by

legal regulation about sustainable mobility standard, and what are the responsibilities of each institution to involve in planning process. Actor involving can be seen from the willingness and *commitment* of the actors to work together, make partnership and consistent to do their responsibility to reach sustainable mobility. The successful of commitment achievement is also depend on the clear communication and coordination path between stakeholders. Further, this step is influenced by actor's trust to government's *eligibility*. Eligibility can be seen from effectiveness, competency, accountability, transparency, integration, and efficiency (Bertha, 2009).

6.1.4 Stage 5 Comparison of Stage 4 with stage 2

There are five dimensions which are become comparison object in this analysis. These five dimensions are taken based on Bertha's attributes for collaborative approach (**Table 2.5**). As we know, that the problems in BOCIMI road network can not be solved by technical approach only. This statement is considered when technical policy by government totally couldn't solve traffic congestion on BOCIMI. Many activities and new actors have emerged besides road network. As the consequence, the planners need to include collaborative approach in this problem.

This stage compares the conceptual model based on theoretical and regulation with the complex situation in rich picture. The lacking between the "real world" and conceptual model caused the difficulty to reach main goal of the system. In this case, the main goal is sustainable mobility realization in BOCIMI road network. Focus in this comparison analysis is refers to the ideal of collaborative approach in order sustinable mobility realization, including the integration between land use pattern and transport system. **Table 5.3** below describes the comparison between real world from rich picture and conceptual model from literature and regulation study.

Table 6.2. Comparison Table between Real World and Conceptual Model

No	Attributes	Element	Comparison	
			Conceptual Model	Real World
1	Shared	a. Resources b. Responsibility distribution	There is share resource from each level of government and it regulated by clear procedure and legal responsibility regulation	a. Less resource shared from national and province government, consequently local government difficult to adjust the policies. b. There is clear legal responsibility distribution, without spesific SOP
2	Access	a. Tools b. Information c. Human	There should be regulation about sustainable mobility realization, human resource who could interpret sustainable mobility concept and realize that in the reality, and information policy	a. There is no concrete regulation about sustainable mobility realization b. Less human resource c. No information transfer about sustainable mobility policy
3	Commitment	Coordination and Communication Path Cooperation	Clear coordination and communication path between each governmental level, including non-governmental actors Legal commitment between actor about sustainable mobility realization	a. Missed-communication often happens between each governmental level b. Less non-governmental actor's involvement c. No legal commitment between each actors
4	Connector	Advocate	There is the effective and legal body that can engage all of actor's interest and try to maximize actor's interests	National Government has build "Forum LLAJ" as consultation body, but it doesn't work for BOCIMI road network
5	Eligibility	Effectiveness Competency Accountability Integration Efficiency	This attribute is important to build the society's trust, increase the willingness of the actors to involve in planning process	Most of the society give negative appraisalment to government's eligibility in decentralization era

Source : Author Analysis, 2013

Resource, especially funding, is one of important matters in sustainable mobility realization. Based on interview result, funding is a major reason for local government to hard in realize national government's policy about BOCIMI road network improvement. Ideally, there should be several legal share resource procedures between each governmental level. These procedures include standard operating procedure about responsibility and risk distribution about sustainable mobility in BOCIMI road network. Unfortunately, in the fact national government or province government give less resource shared to BOCIMI improvement. Besides that, they haven't arranged legal procedure about resource shared. Law number 22 year 2009 generally regulates the responsibility of each government level based on road's status. But there is no clear the specific rules, how they can communicate and interact between each others.

The regulation about interaction between actors surely relates with regulation about goals and standard. In this case, there is no regulation about

sustainable mobility realization in BOCIMI road network. The next problem is regulation arrangement needs human resource as the subjects who interpret the sustainable mobility and its indicators. Limited human resource also becomes the main resistor. Finally, information flow about the importance of sustainable mobility and its policy haven't arrived in the society.

In decentralization era, missed-communication between each actor can be an obstacle to reach the goal. "Self-development" principle makes each local government just concern to their interest. In the fact, this self-development also followed by less non-governmental actor's involvement. Because of that, coordination and communication path are big challenges to the planners as advocates in planning arena. How they can engage all of the interest to reach the maximum interest compliance, and how they can build public's commitment to involve and give positive contribution in planning arena. Further, this step also influenced by eligibility of government and the trust degree of the society.

6.1.5 Stage 6 Definition of Feasible Desirable Changes

This stage defined the desirable changes that are expected by comparison result between conceptual model and the rich picture. Some of desirable and feasible changes to improve the BOCIMI network performance have identified: increase the integration degree between transport system and land use pattern, sustainable mobility realization, decrease the loss of money and time, also increase the quality of environment and social concerns.

Achievement of these objectives depends on the successful of collaborative process between each stakeholder, how they combine their interests become one agreement as a base to make a legal regulation about BOCIMI network performance improvement. Resource and responsibility distribution (shared attribute) between each level of government and non-governmental stakeholders become important as the consequence of decentralization in governance system. To make sure this distribution runs effectively, the empowerment of access is needed, including human knowledge and policy information flow. Commitment building needs to start from the beginning process of planning. To stimulate the willingness of stakeholder to involve in planning

arena, connector body takes the main role. They should engage various interests become the optimum interest fulfilment for each stakeholder. The successful of all processes in collaborative approach are depending on eligibility of institution. Because of that, it is important for existing institution to increase their eligibility: competency, accountability, integration, efficiency, and effectiveness.

6.1.6 Stage 7: Action to Solve the Problem Situation

Land use and transport have interdependency correlation; they can't be separated in urban planning. Legal, institutional and social aspect have important role to build integration between land use and transport. This integration is a main key to realize the sustainable mobility. Institutional setting in decentralization era becomes a big challenge to support the realization. Because of that, so far BOCIMI road network need institutional setting strategy to improve its performance and sustainable mobility context. Besides that, this strategy also can be potential factor to increase the trust of public to government performance so that they would be ready to involve, give positive contribution for sustainable mobility realization. Completely, this strategy will be elaborated in **chapter 7**.

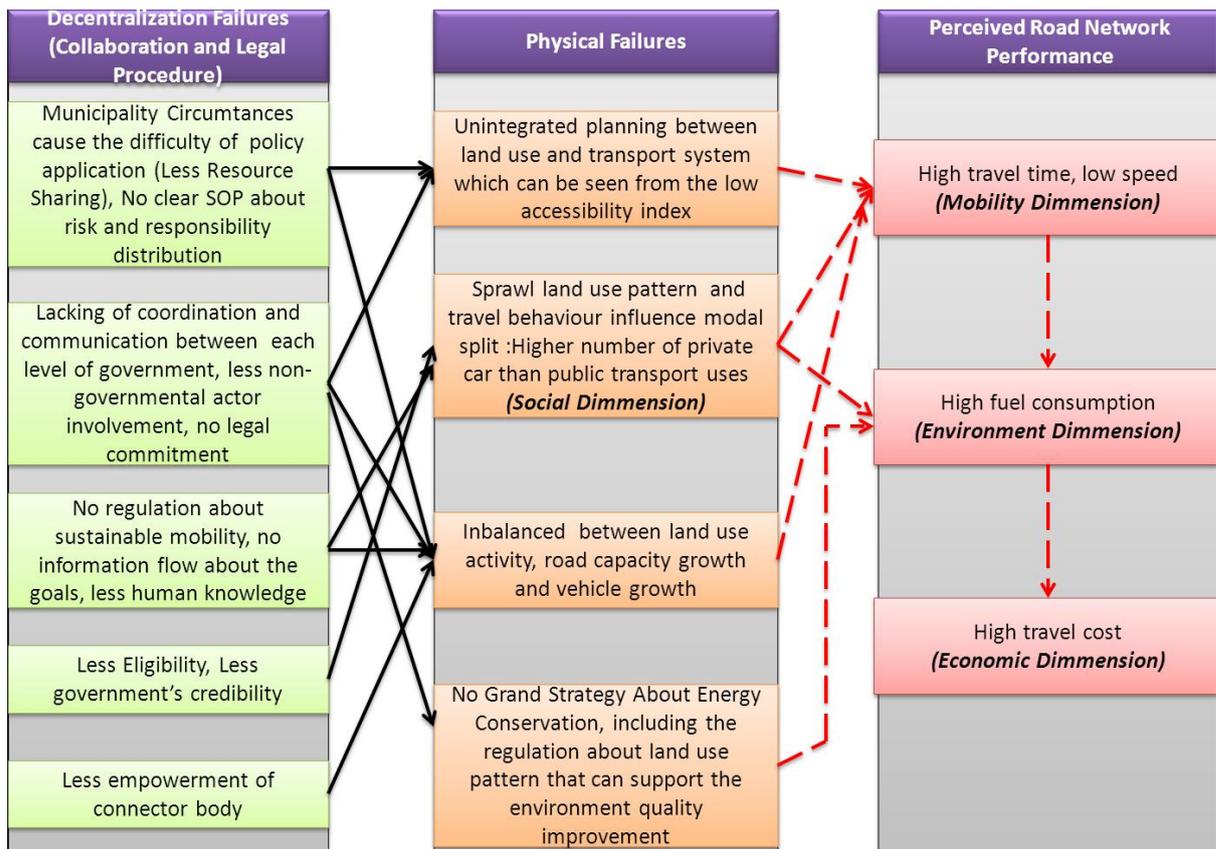
6.2 Correlation Between Complex Stakeholder's Interaction and Empirical Data of Sustainable Mobility Indicators

Analysis results in **Chapter 5** show us that today traffic performance on BOCIMI road network is not suitable with sustainable mobility concept. High traffic density, low mobility degree and accessibility index, higher fuel consumption and travel cost require more serious attention from government, especially national government as a leader and responsible institution in BOCIMI road network. **Section 6.1** has explained the complex interaction between each stakeholder in BOCIMI case. Relating to the aims of this thesis, correlation analysis between physical and decentralization failures need to be arranged. This correlation analysis is arranged to show how the government system in current decentralization era influences the physical failures and finally it will be related with road network performance which is perceived by road users.

Relating with BOCIMI's case, Heeres et al (2012) analysed three dimensions in Dutch's infrastructure planning. These three dimensions are related each other and contribute to the successful of infrastructure planning in Netherland. They are the physical-spatial outcomes of planning actions, interaction and collaborative processes between actors, and legal procedure and instruments. Comparable with this thesis, physical outcomes mean road network performance based on sustainable mobility indicators, interaction and collaborative processes consists of collaborative planning attributes in decentralization era, legal procedures stand for regulation or standard operation procedure in interaction and physical regulation in sustainable mobility.

In fact, decentralization system has contribution for BOCIMI road network performance. All of institutions consider that decentralization emerges harder coordination and communication between each multilevel institution. This condition was completed with un-readiness of local government to develop their areas and no resource sharing, so that many circumstances which are be hinder in policy practice.

Coordination and communication lacking further caused disintegration planning between land use and transport policy. This deficiency is a key reason why sustainable mobility hard to be reached. In this time all of level government just focus to adapt the growth of movement by capacity approach. Whereas, institutional setting also important to ensure the affectivity of policy and accommodate all of interest.



Picture 6.4 The Implication Of Decentralization System For BOCIMI Road Network Performance

Source : Author analysis, 2013

Picture 6.4 above implicitly describes the implication of decentralization failures to physical failures and finally influences BOCIMI road network performance that perceived by road users. Decentralization failures as result of soft system methodology analysis are correlated with descriptive analysis which describes physical condition of BOCIMI road network regarding with sustainable mobility indicators.

a. The Influence of “Shared” Dimension in Decentralization Era to Unintegrated Planning Between Land Use and Transport System and Inbalanced Vehicle Growth and Transport Facilities

Shared attribute is considered as an important attribute to realize collaborative approach in decentralization era. Unfortunately, in BOCIMI’s case there is less resource shared, like funding resource; between each level of government, from National Government, Province, until Local Government. This failure is followed by no clear legal responsibility distribution between each government level. The

lacking of responsibility sharing caused unclear “who” will be responsible to make the integration planning between land use and transport system and “how” they will be interact. Besides that, “stand alone development” principle also gives the contribution to funding failures. Rich cities are difficult to share the funding to the poor cities, higher government level also has its limitation and priority; finally it will be difficult to fund transport and land use integration efforts. Consequently, integrated planning will be harder to be realized. Further, these failures emerge the increasing of mobility needed and vehicle growth, but not balanced with mobility’s facilities. Finally traffic jam was happened, mobility degree decreasing, higher fuel consumption, and higher travel cost.

b. The Influence of “Commitment” Dimension in Decentralization Era to Unintegrated Planning Between Land Use and Transport System; Inbalanced Vehicle Growth and Transport Facilities; and Environmental Effect

Commitment also becomes important attribute to realized sustainable mobility in BOCIMI road network. This plan is a big plan, so that need the strong commitment from various stakeholders. In fact, missed communication between each stakeholder is happened in integrated planning. The actor who involves in this plan also still restricted to government actor, less non-governmental actor involvement. Finally, legal commitment from each stakeholder is difficult to be reached.

Less actor involvement and less legal commitment emerge the difficulty of integrated planning realization between land use and transport to support better environment quality. Each actor will more focus to their interest than inter regional development. These failures also caused the inbalanced vehicle growth and transport stakeholders, when the investor doesn’t involve in planning arena, the vehicle industries don’t be confined by vehicle restriction, and the society doesn’t aware with vehicle uses impact.

c. The Influence of “Access” Dimension in Decentralization Era to Vehicle Uses Growth and Inbalanced Vehicle Growth and Transport Facilities

Section 6.1.4 explained that “access” attribute in this case consists for concrete regulation about sustainable mobility, human resource, and information transfer about sustainable mobility planning to all of stakeholders. In this decentralization era, the government, including national government have no regulation about sustainable mobility realization, including in BOCIMI area. Less regulation can be caused by limited human resource and less supported by political power to realize sustainable mobility in BOCIMI area.

The lacking of regulation and human resource also effects less information flow from policy makers to the society and the other non-governmental actors. Consequently, similar with less commitment failure; the society not aware to vehicle uses impacts and less willingness of non-governmental actors to involve in planning arena. Furthermore, the sustainable mobility will be difficult to be realized.

d. The Influence of “Eligibility” Dimension in Decentralization Era to Vehicle Uses Growth

Actor’s willingness to be involved in planning arena is influenced by the trust from each actor, especially the society. In today condition, the trust from the society to government’s performance is still decreasing. Consequently, the society more apathetic to face government’s policy, including in vehicle uses restriction.

e. The Influence of “Connector” Dimension in Decentralization Era to Inbalanced Development Between Vehicle Uses and Transport Facilities

As the explanation in table 6.2, the National Government by Regulation Number 22 Year 2009 has built forum LLAJ as connector body to formulate the transport policy. This body is built in every local government, consists for government actor from various division and academic actors, exclude the other non-governmental actor, like NGO and investor. Particularly, this body only focus on traffic impact analysis in activity centre development. In other words, this body not concern on multilevel collaboration in decentralization path and not in inter-

regional planning. Consequently, the vehicle uses is growing and infrastructure facilities can't compensate.

Based on causal picture (**picture 6.4**), physical failures are influenced by decentralization failures. This analysis result is supported by Kusbiantoro (1994) argumentation relates with the importance of fit institutional system to synergize land use and transport planning to increase road network performance.

6.3 Concluding Remarks

Based on the explanation above, generally we can conclude that decentralization system influence the sustainable mobility realization. Relates with the assumption that was taken for this thesis (**section 1.1**), analysis result shows us that decentralization system implicates to road network performance. This statement also can answer the second research question in chapter 1 (**section 1.4**). Specifically, the answers of that research question can be described below.

- a. SSM result shows that there are many failures of decentralization system in BOCIMI road network management. Lacking of communication between governmental levels, less non-governmental actor involvement, limited resources, and unclear regulation about collaboration procedure become the main problem in BOCIMI's case.
- b. Those decentralization failures contribute to the emergence of physical failures, un-integrated planning between land use and transport system, and less road network performance which are perceived by road users. Specifically, these failures can be explained below :
 - 1) Less resource and responsibility distribution (shared attribute) between national government, province, local government, and non-governmental actors cause the un-integrated planning between land use and transport system, and also generate less improvement of environmental quality. Moreover, these failures contribute for the high of travel time, high fuel consumption, and high travel cost.
 - 2) No legal commitment between actors and the lacking of coordination between each other are also emerge un-integrated planning between land

use and transport, unbalanced growth of land use activities, road capacity and vehicles.

- 3) Less access and tools for collaboration and interaction; like regulation, information flow, and human resource; cause the sprawl land use pattern, and finally together with travel behaviour, it can influence the high number of private vehicle than public transport.
- 4) Less eligibility of governance system also contribute the modal split of road users. The level of eligibility can influence the trust from road users to change their travel behaviour.
- 5) Less empowerment of connector body made the development of “stand alone development” principle in planning arena. This principle causes the unbalance growth between land use activities, road capacity, and vehicle growth.

Chapter 7

The Institutional Strategy to Promote Sustainable Mobility Realization In BOCIMI AREA

Chapter 5 and **Chapter 6** have explained the physical condition of BOCIMI road network before and after decentralization, current stakeholder's interaction, and government's failures in decentralization era. Those failures (see **section 6.2**) caused worse road network performance that is perceived by road users. According to analysis result, the failures can be divided into five attributes of collaborative approach, and its correlation with physical condition. This chapter will elaborate the answer for the third research question, regarding the institutional strategy to promote sustainable mobility in BOCIMI road network based on previous analysis result.

7.1 “Connector” Empowerment Strategy

Table 2.5 explicitly described that connector body is a crucial part since we realized that there will be many different interest from different actor's perspective that should be engaged. This connector body have a role to engage those various interests to reach the optimum interest fulfilment (advocacy planning, see **section 2.2.2**). By Law number 22 Year 2009 about Road Traffic, national government has built “Forum LLAJ” for each city. This connector body consists of several trans-sectoral institutions, including non-governmental institution, likes academic organization, which are held in one city. Briefly, this body still works in horizontal relationship, without engaging the institutions from multilevel perspective.

Section 6.2 described that in this current time, the lacking of Forum LLAJ function caused the unbalanced of activity, transport facilities, and vehicle growth. The policy makers don't have unifier body to discuss, to determine the best policy which can satisfy all of the stakeholders. As the consequence, they determine their policy by themselves, less communication with the other stakeholders. Specifically, in this case the lacking of “Forum LLAJ” function

caused “self development” in land use policy for each local government, less national government supervision for the road network development, and less awareness of vehicle growth, including travel behaviour, alternative modal providing, and finance policy for vehicle owning.

As the explanation in **chapter 6**, decentralization system causes the sustainable mobility realization in BOCIMI road network should involve various stakeholders with various interests and perspective. To reach the optimum interests fulfilment, the connector body could be act as planning advocate. This body can be triggered by national government, and practically led by province government, in accordance with their task in Law Number 26 Year 2007 about Land Use Pattern (see **section 3.1**). “Forum LLAJ” for BOCIMI can be consists of national government representative, West Java province government representative, Bogor municipality, Sukabumi municipality, potential investor in transport development, industrial community in BOCIMI area, NGO in transport, land use, and environmental field, and the society representative who can be chosen from each administrative boundaries.

The empowerment of “Forum LLAJ” should be legalized by national government (ministry regulation), including its responsibility and interaction path. Eden & Ackerman (1998,p.372-378) (see **section 2.2.2**) proposed the guidelines for optimize the function of connector body, in this case “Forum LLAJ”. Briefly, their guideline relates with BOCIMI case can be explained below.

- a. Invite the representative of National Government, West Java Provincial Government, Sukabumi and Bogor municipality, potential investor, industrial community, NGO in land use development, NGO in environmental matter, NGO in transport matter, and the society representative. This invitation can be shaped as workshop invitation and Forum LLAJ can determine each stakeholder’s role in sustainable mobility realization.
- b. Involve all of the stakeholders into the planning process.
- c. Explain the advantages and the disadvantages of participation to each stakeholder relate with their interests.
- d. Increase the mediator skill, build the clear and consistent task, and adjust with institutional arrangement.

- e. Discuss, negotiate, and share the design for strategy making in order sustainable mobility realization in workshop process.
- f. Build the deepest understanding about sustainable mobility, the importance of land use and transport integration and each institutional culture that involve in planning arena.

The successful of connector body also depends on the ability of representative to take the information from workshop result and give that information for their institution. This work also depends on the willingness of stakeholders to be involved in planning arena, and the ability of the connector to engage the stakeholders.

7.2 “Commitment” Building Strategy

Commitment building is also important for the successful collaborative approach. This attribute relates with the willingness of stakeholders to involve in sustainable mobility realization. Consider that each stakeholder have different interest, commitment building is the most difficult task for connector body. **Table 6.3** shows that there is no legal commitment between each stakeholder in current condition. Furthermore, missed-communication between each level of government often happened and there is no non-governmental actor involvement in land use and transport planning. The impact of this failures, directly influence the physical failures. **Picture 6.4** described that the lacking of commitment emerges the low degree of accessibility index; unbalanced growth of land use activity, road, and vehicle; and also land use arrangement which not consistent to green transport, including energy consumption matter.

The failures of current land use and transport planning caused the decreasing of road network performance that can be measured from sustainable mobility perspective (**chapter 5**). Based on analysis result (**picture 6.4**), the main problem of those failures is the unbalanced between land use activity growth, transport system development, and motorized vehicle use. To solve these problems, some commitment, contract, and cooperation should be arranged.

Urgently, land use review should be done in BOCIMI area. Manage land use pattern which have not developed so that be a support for sustainable mobility realization, including generates less vehicle use and less external effects from

transport activities. Land use control becomes main responsibility of national government. Although the specific land use pattern is implemented by local government, but national government has a strategic role to control the consistency of local government in land use management that have agreed by all stakeholders, including non-governmental actors that are facilitated by “Forum LLAJ”. The commitment result, including reward and punishment for local government or investor or industrial community or society, should be legalised by national government.

However, it will be hard to return the function of BOCIMI road network as national road network by remove the existing land use pattern. As the consequence, the transport planning should be directed into demand adaptation way. This strategy can be realized by transport development contract between government and private sector. The contract not only directed to road network capacity approach and its maintenance, but also rail vehicle and infrastructure development.

To increase the willingness of stakeholders to involve in this sustainable mobility planning, Koppenjan&Klijn (2004,p.212-239) (see **section 2.2.2**) proposed several ways :

- a. Formulate the actor’s position, based on the competencies and each domains of actors;
- b. Introduce new actor, like connector body or infrastructure investor;
- c. Arrange professional codes to influence the ways of looking and acting;
- d. Arrange conflict regulation mechanism;
- e. Creating standard operating procedure of interaction;
- f. Determining the quality of interaction by certification;
- g. Regulating supervision process;
- h. Reframing actor’s interpretation by policy documents and administrative stories;
- i. Build guiding concept which makes actors sensitive to policy realization;
- j. Using crisis as policy windows opportunity to build new resistance condition;
- k. Increased the trust; and
- l. Including the politicians in planning process.

7.3 “Shared” - Distribution Strategy

“Shared” attribute is emerged as the consequence of decentralization in governance development, especially in order sustainable mobility realization. **Table 2.5** explained that shared attribute can be seen from resource and responsibility distribution. In this section, funding will be the main concern to discuss about resource, since local and province government realized that funding is one of big constraint to realize sustainable mobility (see **section 6.1.1**). Kennedy et al (2006) in **section 2.2.2** explained two points of view to determine funding sharing between stakeholders. These points of view also related with responsibility distribution for each government that could be agreed in advocacy planning process.

The first point of view is funding resource in transport development should be held as the external effect compensation. The external effects can be seen from the high number of private vehicle choice (social dimension), highly fuel consumption (environment dimension), and the increasing of transport cost (economic dimension). This point of view take us to the responsibility distribution, with the principle that traffic density contributor should pay the external effect of transport activity. In this case, traffic contributor can be divided into two big parts: private vehicle users and industrial community with their employee and freight transport activities. Concretely, private vehicle users and freight vehicles should pay congestion tax to pass BOCIMI road network. Besides that, freight operational regulation also should be arranged and be obeyed by industrial community. This technique can be considered as an effort to avoid high mixing between private vehicles and big freight vehicles. Employee transport activity also contributes big traffic congestion in peak hour. Because of that, the manufactures need to provide employee vehicle with big occupancy to facilitate the group of employee movement.

The explanation above refers to “*push policy*”, when the road users are stimulated to move from private vehicle uses to public transport, from low occupancy vehicle to high occupancy vehicle. As the consequence, the government also should provide the other choice to transport with “*pull policy*”, stimulates the road users to use more sustainable vehicle and high occupancy.

This policy generates the emergences of the second point of view in funding mechanism: funding as the responsibility of government and private sector.

The responsibility of government and private sector in funding is relating with transport systemic development, including road infrastructure development and its maintenance, public transport development and its facilities, and rail transport development. The partnership between national government and private sector is really important in this attributes, because the development need more resource, especially in funding case.

Distribution of responsibility and resource depends on the willingness of each actor to cooperate, collaborate, and make the legal commitment in sustainable mobility realization. Because of that, commitment building is needed to be considered as a basic in collaborative approach (see **section 7.2**).

7.4 “Access” Development Strategy

Shared, commitment, and connector attributes need “*access*” attribute as implementation basic. Back to **table 6.3** which explained about the comparison of collaborative approach attributes, “*access*” is refers to tools, human resource, and information flow to support sustainable mobility realization. In the real world, there is no concrete regulation about the importance of sustainable mobility realization and less human resources who understand and have more knowledge about that matter. These lacking caused less information flow about sustainable mobility development between each multilevel government and non-governmental actors, including the society.

The deficiency of “*access*” attribute contributes the uncontrolled land use development and modal choice behaviour. Finally, the unbalanced between land use activities, vehicle growth, and infrastructure development are happened. To deal with this condition, the most important that should be improved is human resource quality of each stakeholder, including the ability of advocate (connector body). Human resource investment need to realized in this strategy (Koch&McGrath,1996). Furthermore, Soliman & Spooner (2000) in **section 2.2.2** advised several ways to increase human resource quality:

- i. Synchronize the human's knowledge from each stakeholder with the sustainable mobility realization; this stage can be begun with national and local government worker knowledge improvement and province government as the leader of "*Forum LLAJ*";
- j. Identification of the advantages of knowledge improvement for each stakeholders, be adapted with their interests;
- k. Choosing the suitable knowledge improvement, relates with sustainable mobility and the importance of land use and transport integration;
- l. Implement a know-how strategy;
- m. Creating supportive environments for knowledge improvement;
- n. Use of enabling technologies;
- o. Creating the knowledge management team; and
- p. Creating leadership knowledge.

The increasing of human knowledge can generate better information flow. The information flow can be realized in multilevel information flow, the practical information from lower to upper government level, and the ideal information from upper to lower government level. Horizontally, information flow about sustainable mobility can be done by seminar or workshop which involved all of the stakeholders: investor, NGO, industrial community, and the society. Furthermore, the effective information flow also can help to change the road users to choose modal uses. In this step, NGO and the society representative take a role. Because of that, this strategy can strengthen the importance of collaborative approach in BOCIMI problem solving.

The previous attributes that we have discussed in previous sections should be legalised become legal regulation. Regulation about sustainable mobility, land use development controlling, vehicle growth controlling, vehicle specification restriction, the connector body, multilevel government and non-governmental actor involvement and their commitment, and distribution of funding and responsibility between actors are very important to be arranged. However, regulation arrangement needs good human quality, and to make sure the regulation will be implemented, the effective information flow is crucially needed.

7.5 “Eligibility” Improvement Strategy

Eligibility of institution is important to support the stimulating of actor involvement, especially non-governmental actors, like industrial community and the society as the spearhead of sustainable mobility realization. **Table 2.5** explicitly described the six elements of eligibility attributes: effectiveness, competency, accountability, transparency, integration, and efficiency. Based on survey result which have analysed in **chapter 5** and **chapter 6**, most of the road users and industrial community give negative opinion for the government’s eligibility. Finally they don’t aware to government’s policy, both about land use and transport improvement on BOCIMI road network. As the consequence of collaborative approach in decentralization era, the government should increase their eligibility to increase the society’s trust. This eligibility can be proven by international certification (ISO) publishing for national government, province government, local government, and connector body.

7.6 Constraint Possibility in Strategy Implementation

Miharja&Pitaloka (2013) explained several constraints in transport policy’s inter-local collaboration. The constraints stimulate the unsuccessful policy implementation in metropolitan area; they are consists for leadership, authority, funding, human resources, regulation, information, and culture. Relating with the institutional strategy in this thesis, those constrains can be the awareness to its implementation.

Leadership ability is important in commitment building. How the leader of planning can influence the actors to involve and build legal commitment in sustainable mobility realization. The other important thing in this aspect is how the leader can maintain the commitment that has built by various actors to realize sustainable mobility.

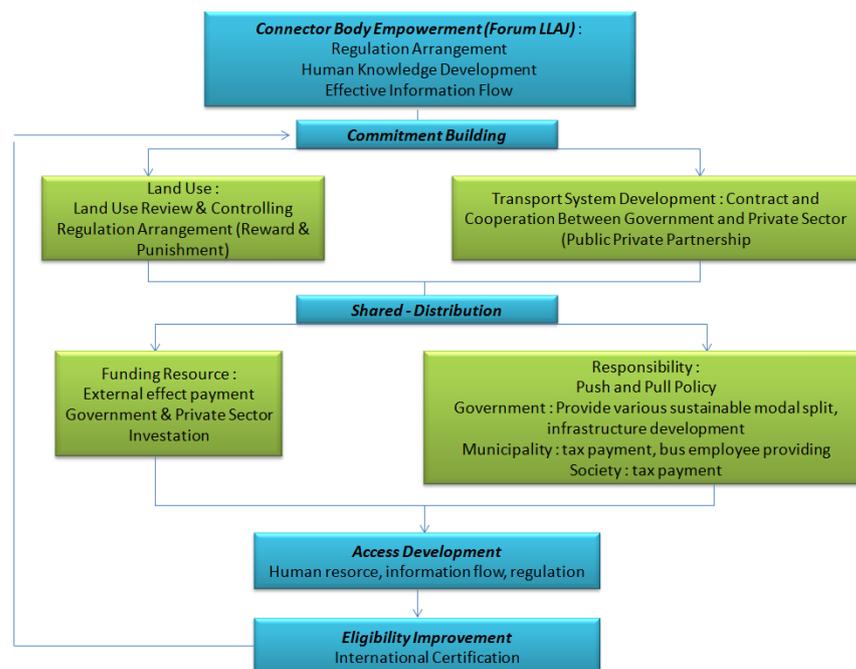
Authority becomes an essential issue in decentralization era. Vague and unclear authority between each actor can be a strong constraint in planning implementation. This constraint has considered in analysis result as one of decentralization era failures. Because of that, clear responsibility distribution and legal commitment about that has to be built.

Resources, including funding and human resource are important tools to realize the sustainable mobility planning. These aspects also have explained in previous chapter, by funding sharing and human resource access, which is followed by information flow to promote the policy making. Culture is considered as the most difficult constraint in policy implementation, especially relates with behaviour change in policy reaction, like modal preference and travel behaviour.

The other factor which can be a constraint in institutional strategy is political and power factors. Those factors relate with the question : how far is the willingness of political position in governance system to involve and support the planning realization?

7.6 Concluding Remarks

The diversity of interest in decentralization era emerge the needed of collaborative approach in institutional strategy in order to realize sustainable mobility in BOCIMI area. The collaborative approach consists of five attributes which are complementary each others. Each attribute is related with transport and land use policy which potential as institutional strategy to realize sustainable mobility on BOCIMI road network. To be consideration, these institutional strategy have its constraint that need to be solved.



Picture 7.1 Collaborative Approach in Institutional Strategy
Source : Author Analysis, 2013

Chapter 8

Conclusion

Chapter 1 explicitly explained that the aim of this thesis is to analyse the implications of decentralization system for BOCIMI road network performance in order to realize more sustainable mobility condition. This aim is reflected to three main research questions and three preliminary questions. Descriptive analysis and soft system methodology are used to reach that aim and answer research questions. This chapter will provide the answer of each research question and the reflection of analysis result based on theoretical framework which have be built in **chapter 2**.

8.1 The Influence of Decentralization on BOCIMI Road Network in Sustainable Mobility Realization

Sustainable mobility definition has its fuzziness with various interpretations from different point of view. Based on various definitions, sustainable mobility can be defined as the fulfilment of mobility needs which are complemented with economic, social, and environmental improvement, as the guarantee that future generation will perceive better mobility performance and less external effects from economic, social, and environmental matters. Various indicators have been selected to be used in this thesis. They are daily number of trips, travel time and average speed to measure mobility dimension; travel length to see the degree of land use and transport integration; travel cost budgeting for to describe economic dimension, modal split to analyse social dimension, and annual energy consumption to elaborate environmental dimension. These indicators are used to measure BOCIMI road network performance, relate with its integration with land use pattern.

Development of sustainable concept forced the planners to involve various stakeholders with various interests in planning arena. One shape of that involvement is decentralization development. Decentralization system can be defined as devolution, delegation or de-concentration process of public service as

a function of governance system, which involve government, market, and society, from national level to province and local level by fiscal, administrative, and political aspect; to ensure the realization of good governance. Theoretically, government policies, including in decentralization shape, will influence the integration between land use and travel activities and finally influence the degree of external impacts of transport activities.

Descriptive analysis result shows that degradation of road network performance was happened on BOCIMI road network before and after decentralization era. This degradation is triggered by the increasing of various activities growth besides BOCIMI road network, since local government has own authority to develop their land use pattern, and transport policy is regulated by National Government. Finally, BOCIMI road network has low performance, with low mobility degree, high traffic density which dominated by private vehicle, high travel cost, and high fuel consumption needed.

Decentralization system in Indonesia has changed financial and administration procedure in land use and transport development. As the consequence, the policy fragmentation and “self development” principle have happened. Land use pattern besides BOCIMI is implemented by local government, and BOCIMI road network is regulated by national government. This fragmentation generates several failures of decentralization system for BOCIMI road network. The failures can be seen as less sharing between each stakeholders, including the lacking of communication and coordination between them; less eligibility; and less connector body empowerment. The relational analysis shows that there are many decentralization failures in BOCIMI management, these failures influence the emergence of physical failures, including un-integrated planning between land use and transport, and finally affect road network performance that is perceived by road users.

8.2 Institutional Strategy

To deal with the failures, several strategies need to be built. The strategy is developed with collaborative approach attributes: connector, commitment, shared, access, and eligibility. Forum LLAJ empowerment as connector can be a good

starting point in this strategy. This forum could facilitate the commitment building, funding and responsibility distribution (sharing) mechanism. This forum and sustainable mobility realization generally need access development by human knowledge, effective information flow, and legal regulation. To complete the strategy, eligibility improvement by certification also need to be published. This eligibility influences the trust and the willingness of actors to involve and make the commitment to realize sustainable mobility in BOCIMI road network.

8.3 Reflection

8.3.1 Theoretical Reflection

The research in this thesis is built based on the basic assumption that decentralization system influences the disintegration planning between land use and transport in BOCIMI road network and finally affects the low road network performance (**section 1.1**). That assumption is strengthened by theoretical framework which explained the influence of governance system, decentralization, and collaborative approach in order to realize sustainable mobility by integrated land use and transport system.

Miller (2004) in **picture 2.2** explicitly described the influence of government policies to land use development, vehicle ownership, and transport activities. Furthermore, this combination between land use and transport activity also emerge the external impacts in environment, social and economic matters. In this research development, we can realize that integration between land use and transport development in decentralization era not only influenced by government policy, demographics, regional economics, and current transport system; but also it influenced by dynamic changing of actor behaviour, both government and non-governmental actor's behaviour. As the consequence, collaborative approach is needed. The collaborative approach attributes which are developed by Bertha (2009) can not only used in infrastructure development, but also in wider planning arena, like transport and land use system.

8.3.2 Reflection in Research Process

Based on this research result, the changed of government system from centralization and decentralization system has changed the practical implementation in land use and transport planning. Besides open the opportunity of participation, decentralization system also has its failures which contribute the failures in land use and transport integration to support the sustainable mobility realization. The policy fragmentation and “self development” have accoured in this case. Consider the deficiency of this thesis about that fragmentation, next research need to be done to analyse fiscal, administrative, and political fragmentation to promote the sustainable mobility in BOCIMI area.

Due to limitation of data acquisition, this research has no specific explanation about land use pattern in BOCIMI area. Transport system still becomes the main core of analysis. This failure can be a challenge for the next research to elaborate more deeply about land use and transport integration for sustainable mobility realization.

As explained before, this research involved various stakeholders by interview method. Indirectly, this thesis can be a good beginning step to stimulate the stakeholder willingness to involve in BOCIMI area improvement. We can't ignore that some stakeholders have less awareness about sustainable mobility and the importance of collaboration and interaction in decentralization era, didn't answer several questions; but that difficulty has tried to be complemented by regulation elaboration which are relate with decentralization practice in planning and transport arena. This reality can be the basic step to do the other research about the increasing of human resource and the willingness of stakeholders to interact in decentralization era. Furthermore the institutional strategies in this thesis have its constraints, because of that, it is needed to make a further research about the collaborative constraints in BOCIMI planning. The limited of sample from the road users is also should be considered in this research. Limited of time can be a main reason for this limitation. However, theoretically the amount of sample in this research has fulfilled the minimum requirement for qualitative research. Finally, I realized that this research is not a perfect research, but hopefully it can contribute the development of knowledge in transport planning.

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APPENDIX

A. Appendix A : Interview Result from National Government

Explanation : *The National Government is represented by Indonesian Ministry of Transportation, who responsible in BOCIMI road network regulation as national road network. This survey were done to get the explanation about the national government's specific responsibility and interest to BOCIMI road network.*

Question :

A. Pendapat Mengenai Sustainable Mobility di Jaringan Jalan BOCIMI

1. Bagaimana pendapat Bapak mengenai perencanaan transportasi dan tata guna lahan di jaringan jalan BOCIMI saat ini? apakah sudah terintegrasi dengan baik atau tidak? Apa kebijakan yang diambil dalam pengintegrasian sistem transportasi dan tata guna lahan?

What do you think about current transport and land use planning on BOCIMI road network? Has it integrated or no? What policy that you take to improve the integration between transport and land use system?

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2. Apakah pendapat Bapak mengenai pernyataan bahwa jaringan jalan BOCIMI adalah salah satu jaringan jalan yang strategis dalam perkembangan ekonomi nasional? Kebijakan transportasi apa yang diambil dalam rangka meningkatkan fungsi BOCIMI sebagai salah satu penunjang perekonomian nasional?

What your opinion about the statement that BOCIMI road network is a strategic road network to support the national economic development? What kind of transport policy that you take to improve the BOCIMI's function as a support of national economic growth?

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3. Bagaimana pendapat Bapak mengenai kehandalan jaringan jalan BOCIMI sebagai jalan nasional?

How your opinion about the reliability of BOCIMI road network as national road network?

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4. Bagaimana pendapat Bapak mengenai persamaan hak setiap orang, baik generasi saat ini maupun generasi dimasa akan datang untuk mendapatkan tingkat aksesabilitas yang lebih baik dalam transportasi untuk menunjang setiap kebutuhannya? Apa kebijakan yang diberlakukan untuk menjamin hak mobilitas dan aksesibilitas setiap individu?

What your opinion about the equity and individual's right, both this generation and next generation to do their mobility and get better accessibility to support their activities? What kind of policy that you taken to protect the individual right to do their mobility and get better accessibility?

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5. Bagaimana pendapat Bapak mengenai manajemen resiko kecelakaan di jaringan jalan BOCIMI saat ini? Apakah sudah berjalan dengan efektif atau belum?

What your opinion about the current accident risk management on BOCIMI road network? Is it effective?

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6. Bagaimana pendapat Bapak mengenai penggunaan energi untuk sektor transportasi di wilayah BOCIMI? Apa kebijakan yang diambil untuk mengurangi tingkat penggunaan energi tidak terbarukan dalam sektor transportasi?

What your opinion about the energy consumption for transport sector on BOCIMI road network? What kind of policy that you taken to decrease the unrenewable uses for transport sector?

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7. Bagaimana pendapat Bapak mengenai polusi udara dan kebisingan yang timbul akibat sektor transportasi dan bagaimana efeknya terhadap kehidupan masyarakat sekitar dan pengguna jalan? Apa kebijakan yang diambil untuk mengurangi efek polusi yang timbul akibat sektor transportasi?

What your opinion about the emergencies of air and noise pollution as the effect of transport system and what its effects for the road users and the society? What kind of policy that you taken to decrease the effect of pollution which is emerge because of transport sector?

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B. Pertanyaan Pendapat Mengenai Kebijakan Transportasi Saat Ini Terkait Dengan Sistem Desentralisasi (*Opinion Questions About Current Policy Transport Relates With Decentralization System*)

1. Bagaimana pendapat Bapak mengenai efektivitas sistem desentralisasi dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the effectiveness of decentralization system to determined the transport policy on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

2. Bagaimana pendapat Bapak mengenai kompetensi dari pemerintah itu sendiri dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What do you think about the government's competency in order transport policy determination on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

3. Bagaimana pendapat Bapak mengenai tingkat tanggung jawab pemerintah dalam menyelesaikan permasalahan transportasi di ruas jalan BOCIMI?

What do you think about the government's accountability to solve the transport problem on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

4. Bagaimana pendapat Bapak mengenai transparansi pemerintah dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the transparency of government in transport policy determination?

Sangat Buruk Buruk Baik Sangat Baik

5. Bagaimana pendapat Bapak mengenai integrasi dan koordinasi penyusunan kebijakan transportasi antara pemerintah pusat, provinsi, dan pemerintah kabupaten/kota?

What your opinion about the degree of integration and coordination between national government, province, and municipality in transport policy arrangement?

Sangat Buruk Buruk Baik Sangat Baik

6. Bagaimana pendapat Bapak mengenai efisiensi dari sistem desentralisasi untuk membuat kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the efficiency of decentralization system in transport policy making on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

7. Bagaimana prosedur interaksi dan koordinasi dengan pemerintah daerah, baik pemerintah provinsi maupun pemerintah kabupaten/kota dalam menentukan kebijakan transportasi dalam hubungannya dengan kebijakan tata guna lahan setiap daerah?

What procedure do you take to interacted and coordinated with province government and municipality in the case policy making determination, relates with each land use policy?

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8. Apa kesulitan dari sistem desentralisasi dalam peningkatan kinerja jaringan jalan BOCIMI dalam rangka perwujudan sustainable mobility? Apa manfaat yang didapatkan dari sistem desentralisasi?

What are the difficulties of decentralization system to improve BOCIMI road network performance in order sustainable mobility realization? What are the advantages of decentralization system?

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9. Bagaimana prosedur dalam pembiayaan pengembangan dan pemeliharaan jaringan jalan BOCIMI? Siapa stakeholder yang terlibat dalam pembiayaan tersebut?

How the funding procedures in BOCIMI road network development and its maintenance? Who are the stakeholders that involved?

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10. Secara umum, bagaimana pendapat Bapak mengenai manajemen institusi dalam menangani permasalahan transportasi di jaringan jalan BOCIMI?

Generally, what your opinion about the best institutional setting to solve the transport problem on BOCIMI road network?

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Answer :

1. Transport planning and land use in BOCIMI network is not well integrated. Whereas, those policy has regulated in RTRW West Java Province. National government (Ministry of Transportation) has roles to make traffic management and engineering, also route determination for public transport in that network.
2. Industry activities in BOCIMI road network has growth, consequently they need better accessibility by traffic management and engineering, road facilities and public transport development. Toll BOCIMI is needed because transport problem in BOCIMI road network is unbalced between demand and supply.
3. BOCIMI is a network which included as the first road class : artery and colector road which could be passed by vehicle with maximum 2500 mm width, 18000 mm length and 4200 mm high, and load axis maximum 10 ton.

4. Realization of reliable transport service, competitive and value added by defends transport facilities services; consolidation procedure by restructurization and transport facilites reformation; increase the accessibility of transport facilities, increase the quality of transport service.

5. Uneffective accident risk management, relates rith :

a. 5 Pillars of National Road Safety Plan

The 1st pillar : road safety management, be responsible to encourage coordination between all of stakeholders and realizing sectoral partnership to ensure the effectivity and sustainablity of road safety strategy in national level, included target determinationin road safety and do evaluation to ensure that road safety is effective and efficient.

The 2nd pillar : road safety, be responsible to provide safe infrastructure in all stage of road development : planning, desain, construction,and road operational. Road infrastructure could reduct and accomodate road user's error.

The 3rd pillar : Safe vehicle, be responsible to ensure that all of vehicle on the road have high safety standard, so that could minimize the accident because of unfuctionality of vehicle system.

The 4th pillar : Safe travel behaviour, be responsible to increase the awareness of road users about road safety by comprehensive programme, included law enforcement and safety education.

The 5th pillar : handling of accident victims, be responsible to increase emergency response by stakeholder's ability increasing and long period rehabilitation to accident victims.

In practice, the fifth pillars do their responsibility with mutually inclusive principes or integrated interaction road safety planning.

6. All of policy aspects should be analyzed as comprehensive system. Transport policy strategy will be impacted for land use policy. This comprehensive system could be more effective way to provide sustainable mobility. Besides that, comprehensive analysis also can be used to determined how could the policy is implemented in practice.

7. In Indonesia, transport sector is the biggest consumer for energy consumption and provide the most emission. Without significant policy, can be predicted that air pollution will increase twice for less than 10 years. The world's awareness to climate change, urbanization, and fuel consumption increasing in Indonesia could be stimulant to solve emission problem in transport sector comprehensively. As a started point, we can use emission standard and fuel specification.
8. Decentralization provides less coordination and consultation, included work network mechanism in central, province, and local government. Consequently, local government almost determine their policy by themselves.
9. Based on government regulation number 37 year 2011 about road traffic forum, this forum responsible to do cross-institution coordination which need integrated policy to plan and solve traffic problem.

Appendix B : Interview Result from Province Government

Explanation : *The Province Government is represented by West Java Transport Agency, who responsible to facilitate the cooperation in planning process between each local government. This survey were done to get the explanation about the province government's specific responsibility and interest to BOCIMI road network.*

Questions :

A. Pendapat Mengenai Sustainable Mobility di Jaringan Jalan BOCIMI

1. Bagaimana pendapat Bapak mengenai perencanaan transportasi dan tata guna lahan di jaringan jalan BOCIMI saat ini? apakah sudah terintegrasi dengan baik atau tidak? Apa kebijakan yang diambil dalam pengintegrasian sistem transportasi dan tata guna lahan?

What do you think about current transport and land use planning on BOCIMI road network? Has it integrated or no? What policy that you take to improve the integration between transport and land use system?

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2. Apakah pendapat Bapak mengenai pernyataan bahwa jaringan jalan BOCIMI adalah salah satu jaringan jalan yang strategis dalam perkembangan ekonomi nasional? Kebijakan transportasi apa yang diambil dalam rangka meningkatkan fungsi BOCIMI sebagai salah satu penunjang perekonomian nasional?

What your opinion about the statement that BOCIMI road network is a strategic road network to support the national economic development? What kind of transport policy that you take to improve the BOCIMI's function as a support of national economic growth?

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3. Bagaimana pendapat Bapak mengenai kehandalan jaringan jalan BOCIMI sebagai jalan nasional?

How your opinion about the reliability of BOCIMI road network as national road network?

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4. Bagaimana pendapat Bapak mengenai persamaan hak setiap orang, baik generasi saat ini maupun generasi dimasa akan datang untuk mendapatkan tingkat aksesabilitas yang lebih baik dalam transportasi untuk menunjang setiap kebutuhannya? Apa kebijakan yang diberlakukan untuk menjamin hak mobilitas dan aksesibilitas setiap individu?

What your opinion about the equity and individual's right, both this generation and next generation to do their mobility and get better accessibility to support their activities? What kind of policy that you taken to protect the individual right to do their mobility and get better accessibility?

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5. Bagaimana pendapat Bapak mengenai manajemen resiko kecelakaan di jaringan jalan BOCIMI saat ini? Apakah sudah berjalan dengan efektif atau belum?

What your opinion about the current accident risk management on BOCIMI road network? Is it effective?

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6. Bagaimana pendapat Bapak mengenai penggunaan energi untuk sektor transportasi di wilayah BOCIMI? Apa kebijakan yang diambil untuk mengurangi tingkat penggunaan energi tidak terbarukan dalam sektor transportasi?

What your opinion about the energy consumption for transport sector on BOCIMI road network? What kind of policy that you taken to decrease the unrenewable uses for transport sector?

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7. Bagaimana pendapat Bapak mengenai polusi udara dan kebisingan yang timbul akibat sektor transportasi dan bagaimana efeknya terhadap kehidupan masyarakat sekitar dan pengguna jalan? Apa kebijakan yang diambil untuk mengurangi efek polusi yang timbul akibat sektor transportasi?

What your opinion about the emergencies of air and noise pollution as the effect of transport system and what its effects for the road users and the society? What kind of policy that you taken to decrease the effect of pollution which is emerge because of transport sector?

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8. Pertanyaan Pendapat Mengenai Kebijakan Transportasi Saat Ini Terkait Dengan Sistem Desentralisasi (*Opinion Questions About Current Policy Transport Relates With Decentralization System*)

11. Bagaimana pendapat Bapak mengenai efektivitas sistem desentralisasi dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the effectiveness of decentralization system to determine the transport policy on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

12. Bagaimana pendapat Bapak mengenai kompetensi dari pemerintah itu sendiri dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What do you think about the government's competency in order transport policy determination on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

13. Bagaimana pendapat Bapak mengenai tingkat tanggung jawab pemerintah dalam menyelesaikan permasalahan transportasi di ruas jalan BOCIMI?

What do you think about the government's accountability to solve the transport problem on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

14. Bagaimana pendapat Bapak mengenai transparansi pemerintah dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the transparency of government in transport policy determination?

Sangat Buruk Buruk Baik Sangat Baik

15. Bagaimana pendapat Bapak mengenai integrasi dan koordinasi penyusunan kebijakan transportasi antara pemerintah pusat, provinsi, dan pemerintah kabupaten/kota?

What your opinion about the degree of integration and coordination between national government, province, and municipality in transport policy arrangement?

Sangat Buruk Buruk Baik Sangat Baik

16. Bagaimana pendapat Bapak mengenai efisiensi dari sistem desentralisasi untuk membuat kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the efficiency of decentralization system in transport policy making on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

17. Bagaimana prosedur interaksi dan koordinasi dengan pemerintah pusat, dan pemerintah kabupaten/kota dalam menentukan kebijakan transportasi dalam hubungannya dengan kebijakan tata guna lahan setiap daerah?

What procedure do you take to interacted and coordinated with national government and municipality in the case policy making determination, relates with each land use policy?

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18. Apa kesulitan dari sistem desentralisasi dalam peningkatan kinerja jaringan jalan BOCIMI dalam rangka perwujudan sustainable mobility? Apa manfaat yang didapatkan dari sistem desentralisasi?

What are the difficulties of decentralization system to improve BOCIMI road network performance in order sustainable mobility realization? What are the advantages of decentralization system?

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19. Secara umum, bagaimana pendapat Bapak mengenai manajemen institusi dalam menangani permasalahan transportasi di jaringan jalan BOCIMI?

Generally, what your opinion about the best institutional setting to solve the transport problem on BOCIMI road network?

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Terima kasih atas bantuan dan kerjasamanya

Answer :

1. Transport and land use planning in BOCIMI have not well integrated.
The policy which have taken by government is traffic engineering and management to minimize transport impact from land use development.
2. Economically, BOCIMI road network is one of strategic network. Because of that it needs big investation to increase the mobility in BOCIMI. This network needs more alternative problem soving that could be provide more economic and social benefit for the society.
3. Transport and land use system has strong interpedency :
 - a. Traffic pattern is influenced by transport system and activity system in BOCIMI network.
 - b. Traffic pattern will influenced BOCIMI's activity system and influence transport service
 - c. Traffic pattern will change transport system. This reality must be prevented by new transport service or current road modification (traffic management)
4. To improve the accessibility, firstly we have to consider the factors which are influence accessibility : geometric, road quality, trip length, travel time, and land use. Traffic problem in BOCIMI is caused by unbalanced between demand and supply. Because of that, we can build new road capacity. Unfortunately, this policy is constrained by land aquition. The other alternative is demand restriction by traffic management : balancing trip generation and distribution.

5. BOCIMI has well accident risk management : feasible traffic signs.
6. The society can fulfill their energy needed, and to decrease oil fuel consumption, we can develop gas uses for transport.
7. Air and noise pollution can be prevented by regular test for public and freight transport every six months.
8. Interaction and coordination process in decentralization system with central and local government to determine transport policy relates with land use policy was done by “MUSRENBANG” (Plan and Development Coordination).
9. The difficulty of decentralization system can be perceived in maintenance process
10. Problem solving for BOCIMI : Adapt transport changes and development, increase human resources, demografy changing, technology increasing and operational efficiency.

Appendix C : Interview Result from Local Government

Explanation : *The Local Government is represented by Bogor Transport Agency, who responsible to implemeted transport policy and land use in BOCIMI area. This survey were done to get the explanation about the local government's specific responsibility and interest to BOCIMI road network.*

Kepada Yth. Bapak Kepala Dinas Perhubungan Kabupaten Bogor

Dear Participants,

“Sustainable Mobility” saat ini menjadi issue yang menarik dan penting untuk dikaji di ranah perkembangan transportasi nasional. Sebagaimana kita ketahui bersama bahwa salah satu kunci keberhasilan dalam perwujudan sustainable mobility adalah terintegrasinya perencanaan transportasi dan tata guna lahan. Banyak aspek yang diperlukan dalam mewujudkan integrasi tersebut, termasuk integritas institusi pemerintahan yang terlibat langsung dalam pengambilan kebijakan perencanaan transportasi antar-wilayah. Sistem desentralisasi yang berlaku saat ini di Indonesia tentunya mempengaruhi sistem pengambilan kebijakan dalam pengembangan transportasi dan tata guna lahan.

Nowadays, “Sustainable Mobility” is an interesting and important issue to be analyzed in national transport development. As we know, that one of the key in sustainable mobility realization is transport and land use integration. Many aspect which are needed to create that integration, included the reliability of government who is involved directly in transport policy. Surely, decentralization system in Indonesia will influence the system of policy making in transport and land use development.

Jaringan jalan BOCIMI (Bogor, Ciawi, dan Sukabumi) yang menghubungkan kota Bogor dan Sukabumi merupakan salah satu jaringan strategis di Pulau Jawa. Jaringan jalan ini memiliki nilai ekonomi yang tinggi karena menghubungkan kota penyangga Jakarta sebagai ibukota negara. Sebagai hipotesa awal, dapat dinyatakan bahwa tingkat kompleksitas dalam pengambilan kebijakan transportasi yang terintegrasi dengan perencanaan tata guna lahan di era desentralisasi ini semakin meningkat. Akibatnya, terjadi ketidakseimbangan antara perkembangan kegiatan dan transportasi. Perkembangan kegiatan di jalur BOCIMI semakin meningkat, sehingga jaringan jalan ini kehilangan karakteristiknya sebagai jaringan jalan nasional.

BOCIMI network which is connects Bogor and Sukabumi is one of strategic road network in Java Island. This road network has high economic value because connects the buffer cities of Jakarta, as a capital city of Indonesia. As a begin hypothesis, in decentralization era the complexity degree of integrated policy between land use and transport is increased. Consequently, unbalanced development between transport and land use has happened. The growth of activity surrounds BOCIMI network has increased, furthermore BOCIMI network loss its characteristic as national road network.

Formulir ini adalah isian mengenai pendapat Bapak/ibu mengenai pengaruh sistem desentralisasi terhadap perwujudan *sustainable mobility* di jaringan jalan BOCIMI. Mohon perkenan Bapak untuk mengisi pertanyaan-pertanyaan di bawah ini.

This form consists of the opinion questions about the influence of decentralization system in order sustainable mobility realization.

9. Pendapat Mengenai Sustainable Mobility di Jaringan Jalan BOCIMI

10. Bagaimana pendapat Bapak mengenai perencanaan transportasi dan tata guna lahan di jaringan jalan BOCIMI saat ini?apakah sudah terintegrasi dengan baik atau tidak? Apa kebijakan yang diambil dalam pengintegrasian sistem transportasi dan tata guna lahan?

What do you think about current transport and land use planning on BOCIMI road network? Has it integrated or no? What policy that you take to improve the integration between transport and land use system?

Land use pattern in BOCIMI network has not integrated with transport policy. To improve that, local government will plan integrated land use and transport for unconstructed area and strickt regulation fou constructed area.

11. Apakah pendapat Bapak mengenai pernyataan bahwa jaringan jalan BOCIMI adalah salah satu jaringan jalan yang strategis dalam perkembangan ekonomi nasional? Kebijakan transportasi apa yang diambil dalam rangka meningkatkan fungsi BOCIMI sebagai salah satu penunjang perekonomian nasional?

What your opinion about the statement that BOCIMI road network is a strategic road network to support the national economic development? What kind of transport policy that you take to improve the BOCIMI's function as a support of national economic growth?

BOCIMI is strategic network. Because of that, toll construction is needed to devide freight transport and the other vehicle.

12. Bagaimana pendapat Bapak mengenai kehandalan jaringan jalan BOCIMI sebagai jalan nasional?

How your opinion about the reliability of BOCIMI road network as national road network?

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13. Bagaimana pendapat Bapak mengenai persamaan hak setiap orang, baik generasi saat ini maupun generasi dimasa akan datang untuk mendapatkan tingkat aksesabilitas yang lebih baik dalam transportasi untuk menunjang setiap kebutuhannya? Apa kebijakan yang diberlakukan untuk menjamin hak mobilitas dan aksesibilitas setiap individu?

What your opinion about the equity and individual's right, both this generation and next generation to do their mobility and get better accessibility to support their activities? What kind of policy that you taken to protect the individual right to do their mobility and get better accessibility?

I agree that next generation should get better accessibility. Because of that, integrated planning between land use and transport will be arranged.

14. Bagaimana pendapat Bapak mengenai manajemen resiko kecelakaan di jaringan jalan BOCIMI saat ini? Apakah sudah berjalan dengan efektif atau belum?

What your opinion about the current accident risk management on BOCIMI road network? Is it effective?

Accident risk management still have not effective yet. There were many accident which happened in BOCIMI Road network. Topography and freight transport are the most dangerous factors.

15. Bagaimana pendapat Bapak mengenai penggunaan energi untuk sektor transportasi di wilayah BOCIMI? Apa kebijakan yang diambil untuk mengurangi tingkat penggunaan energi tidak terbarukan dalam sektor transportasi?

What your opinion about the energy consumption for transport sector on BOCIMI road network? What kind of policy that you taken to decrease the unrenewable uses for transport sector?

Vehicle technology improvement : gas fuel development, elictrical and sun energy empowerment.

16. Bagaimana pendapat Bapak mengenai polusi udara dan kebisingan yang timbul akibat sektor transportasi dan bagaimana efeknya terhadap kehidupan masyarakat sekitar dan pengguna jalan? Apa kebijakan yang diambil untuk mengurangi efek polusi yang timbul akibat sektor transportasi?

What your opinion about the emergencies of air and noise pollution as the effect of transport system and what its effects for the road users and the society? What kind of policy that you taken to decrease the effect of pollution which is emerges because of transport sector?

Pollution was really annoyed the people who live beside the network. We should develop mass transyt and green vehicle.

17. Pertanyaan Pendapat Mengenai Kebijakan Transportasi Saat Ini Terkait Dengan Sistem Desentralisasi (*Opinion Questions About Current Policy Transport Relates With Decentralization System*)

20. Bagaimana pendapat Bapak mengenai efektivitas sistem desentralisasi dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the effectiveness of decentralization system to determined the transport policy on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

21. Bagaimana pendapat Bapak mengenai kompetensi dari pemerintah itu sendiri dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What do you think about the government's competency in order transport policy determination on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

22. Bagaimana pendapat Bapak mengenai tingkat tanggung jawab pemerintah dalam menyelesaikan permasalahan transportasi di ruas jalan BOCIMI?

What do you think about the government's accountability to solve the transport problem on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

23. Bagaimana pendapat Bapak mengenai transparansi pemerintah dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the transparency of government in transport policy determination?

Sangat Buruk Buruk Baik Sangat Baik

24. Bagaimana pendapat Bapak mengenai integrasi dan koordinasi penyusunan kebijakan transportasi antara pemerintah pusat, provinsi, dan pemerintah kabupaten/kota?

What your opinion about the degree of integration and coordination between national government, province, and municipality in transport policy arrangement?

Sangat Buruk Buruk Baik Sangat Baik

25. Bagaimana pendapat Bapak mengenai efisiensi dari sistem desentralisasi untuk membuat kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the efficiency of decentralization system in transport policy making on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

26. Bagaimana prosedur interaksi dan koordinasi dengan pemerintah pusat, dan pemerintah provinsi dalam menentukan kebijakan transportasi dalam hubungannya dengan kebijakan tata guna lahan setiap daerah?

What procedure do you take to interacted and coordinated with national government and province in the case policy making determination, relates with each land use policy?

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27. Apa kesulitan dari sistem desentralisasi dalam peningkatan kinerja jaringan jalan BOCIMI dalam rangka perwujudan sustainable mobility? Apa manfaat yang didapatkan dari sistem desentralisasi?

What are the difficulties of decentralization system to improve BOCIMI road network performance in order sustainable mobility realization? What are the advantages of decentralization system?

Transport policy from central government can't be implemented in local level, whereas transport policy doesn't have area bordered principle.

28. Secara umum, bagaimana pendapat Bapak mengenai manajemen institusi dalam menangani permasalahan transportasi di jaringan jalan BOCIMI?

Generally, what your opinion about the best institutional setting to solve the transport problem on BOCIMI road network?

Unwell coordination between government level, consequently problem solving in BOCIMI need long time to be done.

Terima kasih atas bantuan dan kerjasamanya

Appendix D : Interview Result from NGO

Explanation : This survey were done to get the explanation about the NGO specific responsibility and interest to BOCIMI road network.

A. Pendapat Mengenai Sustainable Mobility di Jaringan Jalan BOCIMI

1. Bagaimana pendapat Bapak/Ibu mengenai perencanaan transportasi dan tata guna lahan di jaringan jalan BOCIMI saat ini?apakah sudah terintegrasi dengan baik atau tidak?

What do you think about current transport and land use planning on BOCIMI road network? Has it integrated or no?

In Indonesia, most of transport and land use planning are not integrated. The government doesn't consistent to defends land use pattern which have determined by RTRW. Concequently, infrastructure building are not fit with its function, and land use planning always change. There are many activities beside artery and colector road, so that national road looks like local road.

2. Apakah pendapat Bapak/Ibu mengenai pernyataan bahwa jaringan jalan BOCIMI adalah salah satu jaringan jalan yang strategis dalam perkembangan ekonomi nasional?

What your opinion about the statement that BOCIMI road network is a strategic road network to support the economic development?

Yes, I agree that Bogor, Ciawi and Sukabumi are buffer are for Jakarta as capital city of Indonesia. Because of that BOCIMI is a strategic road network to support the national economic stability.

3. Bagaimana pendapat Bapak/Ibu mengenai kehandalan jaringan jalan BOCIMI sebagai jalan nasional?

How your opinion about the reliability of BOCIMI road network as national road network?

From road structural view, this road network can be included as realiable road network. But if we looked from the function, this road network is not reliable as national road network.

4. Bagaimana pendapat Bapak/Ibu mengenai persamaan hak setiap orang, baik generasi saat ini maupun generasi di masa akan dating, untuk mendapatkan tingkat aksesabilitas yang lebih baik dalam transportasi untuk menunjang setiap kebutuhannya?

What your opinion about the equity and individual's right, both this generation and next generation to do their mobility and get better accessibility to support their activities?

Yes, I agree that in sustainable road system context, we should consider to next generation interests, so that they will not get worse road service than current condition.

5. Bagaimana pendapat Bapak/Ibu mengenai manajemen risiko kecelakaan di jaringan jalan BOCIMI?

What your opinion about the accident risk management on BOCIMI road network?

Accident risk management in BOCIMI road network still not sufficient. But relates with regulation number 22 year 2009 about Road Traffic, National government has tried to improve by safety standard of road.

6. Bagaimana pendapat Bapak/Ibu mengenai penggunaan energi untuk sektor transportasi di wilayah BOCIMI?

What your opinion about the energy consumption for transport sector on BOCIMI road network?

Indonesia is one of country which has bad energy consumption, specially in transport sector. Indonesia doesn't have grand strategy for energy conservation. As the example, the price of fuel is really cheap, and finally the society not really aware to save energy.

7. Bagaimana pendapat Bapak/Ibu mengenai polusi udara dan kebisingan yang timbul akibat sektor transportasi dan bagaimana efeknya terhadap kehidupan masyarakat sekitar dan pengguna jalan?

What your opinion about the emergencies of air and noise pollution as the effect of transport system and what its effects for the road users and the society?

Relates with question number 6, because of the lower price of fuel, so that the society prefer private car, and the government doesn't provide reliable public transport. Consequently, the increasing of pollution and noise has happened.

B. Pertanyaan Pendapat Mengenai Manajemen Transportasi Yang Telah Dilakukan Oleh Pemerintah Saat Ini Terkait Dengan Sistem Desentralisasi (*Opinion Questions About Transport Management Which Are Have Be Done By Government Relates With Decentralization System*)

1. Bagaimana pendapat Bapak mengenai efektivitas sistem desentralisasi dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the effectiveness of decentralization system to determined the transport policy on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

2. Bagaimana pendapat Bapak mengenai kompetensi dari aparat pemerintah dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What do you think about the government's competency in order transport policy determination on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

3. Bagaimana pendapat Bapak mengenai tingkat tanggung jawab pemerintah dalam menyelesaikan permasalahan transportasi di ruas jalan BOCIMI?

What do you think about the government's accountability to solve the transport problem on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

4. Bagaimana pendapat Bapak mengenai transparansi pemerintah dalam menentukan kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the transparency of government in transport policy determination?

Sangat Buruk Buruk Baik Sangat Baik

5. Bagaimana pendapat Bapak mengenai integrasi dan koordinasi penyusunan kebijakan transportasi antara pemerintah pusat, provinsi, dan pemerintah kabupaten/kota?

What your opinion about the degree of integration and coordination between national government, province, and municipality in transport policy arrangement?

Sangat Buruk Buruk Baik Sangat Baik

6. Bagaimana pendapat Bapak mengenai efisiensi dari sistem desentralisasi untuk membuat kebijakan transportasi di ruas jalan BOCIMI?

What your opinion about the efficiency of decentralization system in transport policy making on BOCIMI road network?

Sangat Buruk Buruk Baik Sangat Baik

7. Silahkan tuliskan pendapat Bapak mengenai langkah-langkah yang harus dilakukan oleh pemerintah untuk menyelesaikan permasalahan transportasi di ruas jalan BOCIMI terkait dengan sistem desentralisasi saat ini.

Please write your general opinion about how to solve the transport problem on BOCIMI road network relates with decentralization system?

Actually, decentralization is a result of society aspiration at the end of Soeharto era (the second president in Indonesia). Unfortunately decentralization doesn't running well, almost policy from local government are not conformable with central government policy. Transport policy should be solved by integrated way, not only local and central government, but also all of sectors. We also could empower the other modes,like train to transport, not only road transport.

Terima kasih atas bantuan dan kerjasamanya