The Role of New Transport Policy on Creating Sustainable and Integrated Public Transit System in Jakarta (Case Study: TransJakarta, Indonesia and Freiburg, Germany)

Master thesis

Muchlisin 850715-T838

Supervisor: Samuel Sebhatu

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DECLARATION

Hereby, I declare that the work described in this thesis is, except those which at legally referred and stated in references, entirely my original work and has not been submitted as an exercise for a degree at this or any other university.

Yogyakarta, August 25th, 2013

Muchlisin
Acknowledgment

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Abstract

Creating sustainable transport become an important key to maintain our environment. Sustainable development is one that meets the needs of the present without compromising the ability of future generations to meet their own needs. Transport policy also has the direct impact and indirect impact that affected to the travelers. Nowadays, Jakarta is facing major challenges in the integrating sustainable transport policy. Research methodology of this research is using qualitative research. By fitting between theories and data collection, qualitative research tends to be associated with words or images as the unit of analysis. The hypothesis was tested by spreading questioners to the respondents as primary data. Learning from successful history of Freiburg about sustainable transport development would make Jakarta understand what the really Jakarta needs to develop sustainable transport policy. This study explored three main groups of policies that can be used to miti```g negative environmental impacts of transport. There are transport technology, transport supply and transport demand. Thus, the result of improving new transport policies to create sustainable public transit are (1) implementing transport technology; (2) adding transport supply proportionally; and (3) reducing transport demand. And the new transport policy takes important role as well as an (1) instrument to reduce environmental impact; (2) as an instrument to increase service level; and (3) as an instrument to crease sustainable transport management. By the result of questioners, the most readily accepted respondents on creating sustainable transport policy by is The Implementation of Transport Technology in Jakarta. This study also compare sustainable transport policy by using the Seven Lessons for Implementing Sustainable Transport Policy in Freiburg, Germany (Buehler & Pucher, 2011) with the existing condition in Jakarta.

Keywords: sustainable transport, integrated transport, transport policy, efficient, effectiveness
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1. Introduction

1.1. Background

As an urban area and capital city of Indonesia, Jakarta is facing crucial problem about transportation. The numbers losses will increase gradually as the traffic jams that are getting worse in Jakarta. Based on data from Land Transport Authority of DKI Jakarta in 2010, total number of private vehicle is 7.25 million unit (98.8 %) and total number of public transport is just only 89,270 unit (1.2 %). In the environmental issues, Jakarta was included as the third polluted city in the world after Mexico and Thailand (Antara, 2009). The hugest influences came from transportation sector which is contributing 70% pollution. Hence, providing sustainable public transport cannot be rejected to reduce pollution. In this research, the author argues that there is some missing links to achieve efficiency and effectiveness in creating integrated and sustainable transport policy among actors in Jakarta’s public transport development. Because since Jakarta government established the first BRT system in 2004, there are no significant improving to figure out transport problem.

Creating sustainable transport become an important key to maintain our environment for the present and future generation. World Commission on Environment and Development (1987) defined that sustainable development is something that can be used to meet the needs of the present without sacrificing the needs of the future generation. Thus, integrating transport policy to create sustainability become an important modal, because sustainability encompasses wide area to be implemented. Transport policy has the direct impact (Stead and Banister, 2001) that affected to the travelers. Walters (2007) argued that public transport was used as an “instrument” of transport policy to provide mobility at reduced costs (subsidized services) to affected community. Transport non-policies (for instance: land-use planning, energy taxation, ICT application) also have important influence in mobility. Stead and Banister (2001) suggested that land-use planning is becoming increasingly recognized as an important ‘non-transport’ policy capable of influencing mobility.

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The other important keys in this research is about the term of efficiency and effectiveness. Efficiency and effectiveness are one of the successful public transit parameters. A lot of definition about both keys in the previous researches. In this research, related by creating sustainable and integrated public transit, the author defined that “efficiency” is more closed with understanding based on environmental thinking. As Sebhatu et al (2011) mentioned that to provide better service and efficiency, public transport must take account of sustainable thinking based on environmental, eco-efficiency and social sustainability and involve all stakeholders. And the term about effectiveness, the author explored that it is more closed about cost-effectiveness. All mobile activities in public transport that encompass ticketing system, punctuality, safety, comfortable, and affordable are related with cost. The author argues that to reinvent cost-effectiveness in transport policy, contractual governance takes important role. Because all contexts to create sustainable public service among each party are included in contractual governance. Contracting is largely connected with the securing of resources, thus acquiring a capacity focus (Ramirez and Wallin, 2000).

Strategic thinking about providing sustainable public transit is very important in urban area, like Jakarta, because that have huge influences in mobility. Gebauer et al., (2010) mentioned that the role of sustainable public transit systems is to develop services and provide mobility that is comfortable, economical, integrated, orderly, efficient, safe, smooth, affordable and effective by the community. To fulfil the goals of sustainable public transit, this research put the role of innovation. Sebhatu et al (2011) argued that innovations should aim to reinvent the way value is created. Hence, restore the truly function of public transport is attempting to provide sustainability as well. The author also want to compare the successful history about developing sustainable transport in Freiburg. Learning from Freiburg’s experience would be a good lesson to develop and implement in creating sustainable transport policy. The aim of this research would press to how the government of Jakarta improve its new transport policy to create sustainable and integrated public transit, particularly TransJakarta as the first BRT system in Jakarta.

And hypothesis testing result become a measurement to know which one is the most accepted transport policy to create sustainability. The measurement was conducted by spreading questioner by using experimental sampling method (Supranto, 2000) with random design complete, or factorial randomized block. Measuring new sustainable transport policy is important, because we can know which transportation policies readily accepted by Jakarta’s citizen for creating sustainability.
1.2. Research Problem

Traffic congestion become the complex problem that should be figured out in Jakarta. The new governor had tried to create integrated transport policy to break down high traffic congestion by increasing service level in TransJakarta. Why TransJakarta? Because TransJakarta is the first BRT system which have huge a chance to create sustainable transport. But, has the BRT system that provided by Jakarta’s governance reached the effectiveness and efficient phase in achieving sustainability? Increasing environmental impact which caused transport field is getting worse over time. Complexity of land-use planning has made the problem of difficulty in the creating integrates public transport. Political attraction is one of the important to be concerned because it has huge influences to determine transport policy. The ambitious of political objectives affect Jakarta didn’t have long term transport policy that reduce environmental impact permanently. The actors of public transport (government, service provider and PTA) are the keys to create effective and efficient integration when producing public transport policy.

1.3. Purpose Research

The purpose of this study actually has two purposes. First, the author would to understand and analyze how Jakarta improve new transport policy, particularly BRT system, to create sustainable and integrated public transit. This thesis intends to give broader analysis in the role of new policy in developing a sustainable and integrated public transport in Jakarta. The expectation through the analysis in this thesis is to find the best way how new policies create sustainable and integrated public transport with the other instruments in Jakarta’s public transport system. And the second purpose is comparison study about creating sustainable transport policy in Freiburg, Germany and TransJakarta, Indonesia. Because, taken lesson of the successful history from Freiburg would be an important learning to develop and implement in the creating sustainable and integrated public transport in Jakarta. Particularly the difficulties to implement sustainable transport policy in both country.

1.4. Research Question

The research problem lead to three fundamental research questions:

a. How the new policy of improving BRT system in Jakarta will be achieved in a very an efficient and effective way?

b. What is the role of the new policy in developing an efficient and effective a sustainable and integrated BRT system?

c. What is the comparison study between Freiburg (Germany) and Jakarta (Indonesia) in the developing sustainable transport policy?
2. Methodological Discussion

2.1. Research Methodology

Research methodology of this research is using qualitative research. By fitting between theories and data collection, qualitative research tends to be associated with words or images as the unit of analysis. Qualitative research use to make description of data (Denscombe, 2007). The qualitative research involved the use and the collection of various empirical materials, like the case study, the personal experience, the biography, the interview, observation, the text of the history, interaction and visual: that picturing routine torque and problematic as well as his meaning in the individual and collective life (Denzin & Lincoln, 1994). Methodology of qualitative research is also used for methodological discussion and analysis of empirical study. The aim of qualitative approach is to explore phenomena, customer thought, feelings or interpretations of meaning and process in railway operational.

In general, this thesis based on literature reviews and comparative studies about creating sustainable transport policy to achieve effectiveness and efficient way. The flow process is to gather primary and secondary data, analyze data, and making comparison. The comparator for the Jakarta sustainable transport development is Freiburg which have been success and become a model of sustainable transport in Germany. The research in Freiburg consist of how Freiburg can develop transport policies become sustain and integrated. What is the factor to determine sustainable transport policy that have been passed in reducing environmental impact? And how Freiburg initiates the first concept in creating sustainability. The result of data analysis, findings and comparison studies would be analyzed to sustainable and integrated transport policy development in Jakarta, particularly TransJakarta as the first BRT system.

One definition of case study research states that it can be seen as a “… research strategy which focuses on understanding the dynamics present within single settings.” (Eisenhardt 1989, p. 534). Thus case studies are used in many situations as research strategy. This includes amongst others, issues in organizational and management studies as well as in city and regional planning research such as public agencies (see Yin 1994). Case study of this research was selected as a multiple case study about TransJakarta BRT system in Jakarta, Indonesia and Freiburg, Germany in developing sustainable and integrated public transport policy.
Regarding on Yin (2009), he mentioned that case study is a specific research methodology that especially can be applied to the situation when we cannot distinguish the variable and its results. Cases might be selected because they are highly effective, not effective, representative, typical, or of special interest. The reason why the author determines that case study is because the high expectation of creating sustainable and integrated transport policy to figure out traffic problems in Jakarta. Learning from sustainable transport development in Freiburg would be best lesson to apply and implement to Jakarta.

Regarding the topic about creating sustainable transport policy, the author takes some important theories to be “married” with empirical related with sustainable transport and it would be an understanding and analysis. Theories that were used are about Sustainable Transport, Sustainability and Innovating Value-Configuration Space, Contractual Governance, Transport Policy and Non-Transport Policy. And for empirical studies of this research are about sustainable transport strategic, particularly about transport policy in Jakarta and Freiburg. The history about TransJakarta was showed as a one of sustainable transport policy to break out traffic congestion in Jakarta. Sustainable transport policy development in Freiburg become a reflection how Jakarta can take an important lesson to create sustainable transport policy since 1969.

2.2. Data Collection

Based on Yin (2003), in case study methods there are six sources of evidence. The six source of evidence are documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts. The resulting evidence may be qualitative, quantitative, or both (see Eisenhardt 1989). This means case study research cannot be equalled with qualitative research as it is often done (see Yin 1994). This thesis uses two sources of data which are documentation and archival record. In documentation, the data researcher collected from official website of related organization, community mailing list, electronic literature that related to the subject of research, news from trusted sources, studies, and letters from related organization. In archival record, the data collections consist of organization records, the written contract, survey data, previous comparative study, historical data, also maps and chart from both of organization.

2.2.1. Primary Data

The primary data of this research is about sustainable strategy of transport policy in Jakarta and Freiburg which be obtained from survey with questioners and interview. Survey with questioners was conducted to measure which one is the most accepted transport policy for supporting sustainability in Jakarta. Total respondent of survey with questioners is 42 people for who have experiences of TransJakarta or Jakarta’s citizen, they have high level of education, and their occupation as civil servant at transport department or ministry of transportation. The respondents are:
1. Civil servant at Ministry of Transportation Indonesia
2. Civil servant at Transport Department of Jakarta
3. Lecture
4. Student of Master Degree or Doctoral Degree

With the optional option are:

1. Very Agree
2. Agree
3. Moderate
4. Disagree
5. Very disagree

For the interview, it has been done with the one of source who work in Jakarta’s Department of Transportation who knows about Master Plan of Jakarta’s Transport Policy.

2.2.2. Secondary Data

The secondary data is literature review and document research about supporting data that obtained from library, e-library and internet investigating related to is supporting transport policy, for instance: non-transport policy (land-use, ITC, etc) related with creating sustainability, the growth of traffic vehicle, service level performance of public transport, etc. For the documents, documents were obtained from the library, e-library and previous study related with sustainable transport topic in Jakarta and Freiburg. Particularly about sustainable transport in Freiburg study, the author uses Google Scholar as a tool to search appropriate study (journals or e-books) about sustainable transport policy in Freiburg. Some data was cited to be an empirical study and some theories or funding were developed to be fitted with empirical data about Jakarta.

Data about Strategy of Macro Transport Pattern Based on Regulation Peraturan Daerah No. 12/2002 and Peraturan Gubernur No. 103/2007 (cited Dishub, 2010) become an important primary data, because it was main strategy of Jakarta to plan and create better transportation. Profile of TransJakarta was showed as a reflection about BRT system to develop sustainable and integrated public transit system. Successful history of Freiburg about developing sustainable transport policy become an import lesson to be implemented in Jakarta.
2.3. Data Analysis

Based on Gummesson (2000) and Yin (2003), case study research intends to consider a situation under study from as many perspectives as possible for building up a comprehensive and rich data illustration (see Johns/Lee-Ross 1998). Therefore it is not astonishing that for designing case studies a wide range of information and data gathering techniques can be employed. Data analysis in this study uses a lot of literatures. Deepening the understanding of transport policy document to be very important in this study. Because we could know the description how a grand design of an urban area in developing sustainable public transport. Learning from the history of transport policy is also important relation to transport planning policy in the future. Therefore, the comparative study between Jakarta and Freiburg is a comparison of the development and implementation sustainable transport policy. Primary data about main strategy transport policy and secondary data on the supporting data are used to compare how a transportation policy designed to achieve sustainable public transport.

The number of total sample (replication) has been chosen by using the method of Experimental Sampling Technique (Supranto, 2000). According Supranto J (2000) for experimental studies with random design complete, or factorial randomized block, it can simply be formulated:

\[(t-1) (r-1) \geq 15\]

Note: \(t = \) the number of treatment
\(r = \) the number of replication

2.4. Thesis Structure

Chapter 1: Introduction.

The chapter about introduction will describe about research background, research problem, purpose research, research questions and limitation. Introduction part describes about general topic of this research.

Chapter 2: Methodological Discussion

Methodological chapter will discuss about research methodology, qualitative research description, case study, collecting data methods (primary and secondary), and analysis methods. Those points are very important in describing process in this research.

Chapter 3: Theoretical Framework

This chapter will explore broadly about all theories that related with the main topic.
Chapter 4: Empirical Study

This chapter is describing the existing condition of BRT system in Jakarta and successful history of creating sustainability in Freiburg. The main focus in this empirical study is about collecting strategic thinking of transport policy in achieving sustainable transport.

Chapter 5: Discussion

This chapter would make understanding and analysis regarding by “marriage” between theories and empirical study.

Chapter 6: Conclusion and Contribution

Conclude all of research process and explain about contribution of this research.

2.5. Validity and Reliability

Research design actually is supposed to represent a logical set of statements, and the researchers also can judge the quality of any given design according to certain logical tests. Concepts that have been offered for these tests include trustworthiness, credibility, conformability, and data dependability (U.S. Government Accountability Office, 1990). Yin (2009) mentioned that there are four step that have been commonly used to establish the quality of any empirical social research. Because case studies are one form of such research, the four tests also are relevant to case studies. There are: (1) Construct validity: identifying correct operational measures for the concepts being studied; (2) Internal validity (for explanatory or causal studies only and not for descriptive or exploratory studies): seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships; (3) External validity: defining the domain to which a study's findings can be generalized; and (4) Reliability: demonstrating that the operations of a study-such as the data collection procedures-can be repeated, with the same results.

Based on the four step concept to test case study (Yin, 2009), the author tried to connect multiplicity of different sources of evidence (report, strategic papers, official document, etc) as fulfilment of validity requirement in order to obtain a holistic view. Furthermore, the connection and relationship are identified and described that might to be generalized to a certain extent since a theoretical framework is built up and then applied to the specific case of sustainable transport development in Jakarta and Freiburg. Yin (2009) defined that reliability as demonstrating that the operations of a study-such as the data collection procedures-can be repeated, with the same results. The goal of reliability is to minimize errors and biases in the study. This means a high degree of reliability indicates that a study could be replicated over and over again (see Gummesson, 2000). Reliability of this here presented thesis is difficult to evaluate since this study has not been replicated until now. The author argues that since the establishment of the framework about sustainable transport development in
Jakarta and Freiburg, repeating or replication should be possible as reliability requirement.

2.6. Outline of Thesis

![Diagram of Thesis Outline]

**Figure 2.1. Outline of Thesis**

2.7. Limitation

The limitation of this thesis is about strategic thinking of transport policy to create sustainability and integrated transportation. Those strategic thinking was limited as the newest strategy which have interval long term period to addressing objectives of transportation. The concern of this study is about developing TransJakarta as the first BRT system and as a part of public transport that Provincial of Jakarta had to be a model as sustainable public transit. The term about *efficiency* was limited about the understanding of protecting environment toward pollution that caused from vehicles. And *effectiveness* was defined as economical thinking to achieve cost-effectiveness of public transport service performance. The author was limited by the distance to understand and analyze both city Jakarta and Freiburg. But for Jakarta, the author has an experience directly to feel what the real condition of transportation in Jakarta is. But for Freiburg, the author just learn from the in-deep study about sustainable transport development.
3. Theoretical Framework

3.1. Sustainable Transport

According to the World Commission on Environment and Development (1987) sustainable development is one that meets the needs of the present without compromising the ability of future generations to meet their own needs. Daly (1991) defines sustainable development as one that satisfies three basic conditions: (a) its rates of use of renewable resources do not exceed their rates of regeneration; (b) its rates of use of non-renewable resources do not exceed the rate at which sustainable renewable substitutes are developed; and (c) its rates of pollution emission do not exceed the assimilative capacity of the environment. (Greene & Wegener, 1997) mentioned that the half million deaths and the many millions of serious injuries caused by transport accidents each year are clearly detrimental to sustainable transport. Indeed, the World Bank (1995) considers the threat to health from transport accidents to be part of the environmental sustainability issue.

Transport is also a major consumer of two critical ‘exhaustible’ resources: In the case of oil, transport is both the predominant and fastest growing consumer. Indeed, transport has been the only sector in which oil demand has been growing over the past twenty year (World Energy Council, 1995). Hence, the needs of creating sustainability in transport field cannot be rejected any more for the better future generation. (Greene & Wegener, 1997) mentioned about three main groups of policies that can be used to mitigate negative environmental impacts of transport. There are: (1) Transport technology as a highly dependent on the technologies used to produce transport and the technologies used to mitigate its impacts because the environmental impacts of transport are not immutable. (2) Transport supply in the form of highway networks or levels of service offered by private carriers or public transport operators is subject to government control and therefore potentially an ideal policy instrument to influence transport demand.

And (3) Transport demand, in term of transport demand management which tries to intercept this vicious cycle by policy to reduce the need for travel such as promoting high-density, mixed land use, preferably near transit stations, encouraging the substitution of travel through telecommunication or by granting special privileges to high-occupancy vehicle on motorways.
3.2. Sustainability and Innovating Value-Configuration Spaces

Sebhatu et al (2011) mentioned that sustainability is argued to be a key driver for innovations. To fulfil the ambitious goals of sustainable public transit, innovations should aim to reinvent the way value is created. Public transportation represents a complex service system that is based on “value-co-production configuration of people, technology, other internal and external service systems, and shared information” (Spohrer et al., 2007). Despite the importance of sustainable public transit services and sustainability in general, existing research does not adequately explore how innovation alters sustainability and value-configuration-spaces. It concentrates instead on travel comfort, punctuality, reliability, pricing, or capacity management, and substantiates the notion of existing value-configuration-space while it should look more properly for ways to apply sustainability thinking and to innovate with respect to value-configuration spaces (Gebauer, et al., 2010; Johnson, et al., 2010).

3.2.1. Sustainability and Sustainable public transport

The emergence of greening, especially concern for “climate change” is one of the principal developments in the transport sector and provides the input needed to deal with the process of integrating sustainability into new infrastructural changes (Sebhatu et al, 2011). To provide better service and efficiency, public transport must take account of sustainable thinking based on environmental, eco-efficiency and social sustainability and involve all stakeholders. As it engages local stakeholders, sustainability thinking is important in creating a value network (Hart, 2007). Friedman (2008) argues that we must innovate rather than regulate our way out of the environmental crisis.

3.2.2. Sustainability, Innovation, and Value creation

Sebhatu et al (2011) mentioned that a service innovation may not only involve new services, but also require. Innovation is essential for sustainable achievement (Nidumolu et al., 2009). Value is co-created through such resource integration (Vargo and Lusch, 2008). Service innovations are based on customer-focused S-D logic whereby value is co-created with customers who are resource new technology, new networks and new procedures integrators (Baron and Harris, 2008). These integrated resources can be private (e.g. self, friends, family), market (from other entities, through economic exchange), or public (collective access from communal and government sources) (Vargo &Lusch, 2011).
3.2.3. Application of Key Concepts to The Sustainable Public Transit Services

To provide better service, and efficiency, public transit services need to meet the challenge of integrating environmental “Eco-Efficiency” and social sustainability and of including all stakeholders. Sustainable thinking creates a value network by engaging local and other important stakeholders (Hart, 2007). The role of sustainable public transit systems is to improve services and provide mobility that is safe, integrated, orderly, smooth, comfortable, economical, efficient, effective and affordable by the community (Gebauer et al., 2010). This allows for the co-creation of value (Vargo and Lusch, 2008).

3.3. Contractual Governance For Sustainable Service

Contracting is largely connected with the securing of resources, thus acquiring a capacity focus (Ramirez and Wallin, 2000). Otley (1999; 2003) argues for performance management, focusing on the management aspects (Otley, 2003) of the concepts of management accounting and control. Otley (1999) concludes that there is a need to develop management accounting and control in three areas: 1) management accountants need to understand operational activities; 2) there is a need to link control systems design with issues of strategy; 3) there is a need to focus on the external context within which the organization is set (ibid. p. 381). Bryntse (2000) provides a detailed account of the contractual governance of public services.

It is sometime claimed that a sustainable business reaches long-term financial stability by minimizing its environmental impact and acting in conjunction with the community's social and cultural expectations (Elkington, 1998). Post et al (2002) have conceptualized stakeholder management using the label stakeholder view, arguing that the implementation of stakeholder management should be seen as an interactive learning process. Enquist et al (2005) mentioned that the stakeholder view makes two distinct contributions on a descriptive level (ibid.). This is even more valid for the public services arena (O’Looney, 1998), where contractual governance skills must be developed (Bryntse, 2000).

In a value-creating stakeholder network, customers and market-orientation become necessary. That’s the reason Enquist et al (2005) illustrate the relationship between the four main actors in public transport as a value creating network of stakeholders.
3.4. Transport Policy

Stead & Banister (2001) mentioned that the understanding term of transport policy clearly has a direct impact on mobility and can be used to influence the supply and demand for transport. Because levels of mobility and car ownership have risen substantially over recent decades (and the increase seems likely to continue), mobility management is becoming more and more important. Thus, public transport was used as an “instrument” of transport policy to provide mobility at reduced costs (subsidized services) to affected community (Walters, 2007).

Based on lessons learned from Commission of the European Communities (1992), the broad objectives of are Common Transport Policy (CTP) are to maintain competitiveness (efficiency), promote cohesion (regional development), while at the same time improving the quality of the environment. Stead & Banister (2001) defined that efficiency is an important economic goal for any sector of society. Of course, an efficient transport sector contributes to the general economic development of society. A goal for efficiency of the transport sector itself has been defined as this is one of many factors influencing general economic development. The goal of regional development is also important to the EU, especially in the face of enlargement. However, much as in the case of the economic development at large, transport is but one of many activities influencing regional development and equity. The environmental protection goal is the most impelling, in the sense that it has to do with the long-term survival of society.

In the recent studies, a distinction has thus been made between infrastructure investment, management of the existing infrastructure and pricing policies. May (1991) argued that the potential policy instruments under each of these headings are considered briefly below.
3.4.1. Infrastructure

Stead and Banister (2001) mentioned that on the private transport side, the main instrument here is clearly road building, although even under this heading one can distinguish between different standards of provision, with a growing interest in the provision of roads with a lower geometric standard on the one hand and of higher environmental quality on the other. For public transport, the range of options is much wider. In conventional rail, schemes include the reopening of old lines and stations, and rationalization of existing operations. Light rail, though, offers a far wider range of new solutions, with marked differences in the extent and nature of their operation, and resulting implications for both access and the environment (Howard, 1989). One or two cities have also considered guided bus ways as an alternative form of dedicated public transport infrastructure (Read et al., 1990).

3.4.2. Management

Regarding Stead and Banister (2001) traffic management proposals form an important element in most strategic transport policies. Measures considered fall into three broad groups: those which increase the capacity of the network, those which reallocate road space between competing demands, and those which aim to achieve environmental improvements. Public transport management, too, has incorporated a wider range of measures. Conventional approaches such as modifying the service level or coverage can now be combined with the provision of alternative types of vehicle, some of which permit greater coverage, or provision for particular groups of people. Information provision is able to be dramatically improved as a result of recent research and development. Across all of these developments lie the effects of deregulation, which has in some cases led to new services, but in others made service integration and information provision more difficult (Association of Metropolitan Authorities 1990 a).

3.4.3. Pricing

There has been a marked tendency in the recent past to ignore the potential of pricing as an instrument of transport policy, perhaps because the debate has tended to focus on the inefficiencies of the subsidy required for fares reductions. In practice fare policies, parking charge policies and charges for car use, whether by supplementary licensing or road pricing, have played an important part in many of the Integrated Transport Studies commissioned to date (Stead and Banister, 2001)

3.5. Non-Transport Policy

As the description about above, transport policy has direct impact in mobility whether supply or transport demand. But, the other important influences mobility is non-transport policy. Stead and Banister (2001) mentioned that transport policy is not the only way to influence mobility. Furthermore, Stead
and Banister (2001) showed the four main influences (see Figure 3. 2.) on mobility (at the center of the diagram), but they are themselves mutually dependent. They are:

1) transport policy (such as road pricing and infrastructure construction);
2) technological change (such as e-commerce, teleconferencing and route guidance systems);
3) social and economic trends (including the ageing of population and globalization trends); and
4) non-transport policies (such as land-use planning, energy taxation and European enlargement).

![Figure 3. 2. Links between Transport Policies, Non-Transport Policies, Social and Economic Trends, Innovation and Technology, and Mobility (Stead and Banister, 2001)](image)

3.5.1. Land-use Planning

Stead and Banister (2001) suggested that land-use planning is becoming increasingly recognized as an important ‘non-transport’ policy capable of influencing mobility. They mentioned that in recent years there has been much interest in tackling the adverse environmental effects of transport by promoting more sustainable forms of urban development in which design and layout can assist in reducing travel (see, for example, Banister and Marshall, 2000; Barton, 2000; Jenks et al., 2000).
On the other hand, at the same time, higher rates of travel and car ownership have led to less sustainable patterns of development (see Fig. 2) (Stead and Banister, 2001). They argued that strong unsustainable trends clearly require equally strong action to reverse them. A number of land-use planning measures are crucial to managing mobility. Figure 2 shows that the higher interaction of travel vehicles tend to difficult for creating sustainable public transport and less of public land-use.

![Diagram](image)

**Figure 3.3.** The Interaction of Driving Forces Behind Land-Use Trends (adapted from Royal Town Planning Institute, 1991; Pharoah, 1992)

### 3.5.2. Information, Communication and Technology (ICT)

Golob and Regan (2001) provide a recent detailed review of the potential implications of ICT on mobility patterns, and much of the material in this section is based on their review. A lot of ways that ICT can effect mobility. Such as in the passenger transport and freight sector. In passengers transport, implementation of ICT policies can be felt as passengers by implementation of e-commerce and e-merchant as well. Stead and Banister (2001) argued that by using e-commerce market (shopping online), the customers or passengers can reduce private or public transport vehicle. For the freight transport sector, Stead and Banister (2001) stated that information and communication technology is playing an increasingly important role in logistics.
3.5.3. Macro-economic Policies

In the recent decade, individual decisions about vehicle ownership and use involve mainly private financial costs, such as vehicle purchase price, insurance and fuel expenses. Parallel with Stead and Banister (2001), they argued that the use of road transport imposes external costs, such as noise and air pollution and congestion. For the government or policy maker, deciding good macro-economic policies can be done via a regulatory framework (by setting emissions levels or allowable traffic volumes, for example, or by specifying the production technology and pollution abatement equipment) or by using market mechanisms such as taxes and charges. Governments have strongly resisted the notion of hypothecation and want to maintain maximum flexibility in expenditure patterns. Nevertheless, there is an increasing desire within governments to switch taxation from production (labor taxes) to consumption (environmental taxes) in a revenue-neutral manner. Such a change might lead to a double dividend by improving both the environment and the efficiency of the tax system (Elkins, 1999).

3.6. Summary of Theories

The author would conclude all theories to make a connection between one theories to the other theories in creating sustainable transport policy. Begun from the main topic about sustainable transport policy, the author separated those topic become “sustainable transport” and “transport policy”. Talk about sustainable transport, the author argues that the term of “sustainability”, “innovation” and “value creation” (Sebhatu et al, 2011) has narrow connection to create sustainable transport. Sebhatu et al (2011) mentioned that a service innovation may not only involve new services, but also require Innovation is essential for sustainable achievement (Nidumolu et al., 2009). Value is co-created through such resource integration (Vargo and Lusch, 2008). “Contractual governance” is also required to bond all stakeholders to create and innovate sustainability.

In policy field in creating sustainability, three main groups of policies that can be used to mitigate negative environmental impacts of transport (Greene & Wegener, 1997) would be an important key to understand and analyze how policy takes roles to create sustainability. The author also argues that the transport policy not only become most influences mobility but also “non-transport policy” (Stead and Banister, 2001) as the outside of transport policy that affect mobility. Hence, “non-transport policy” was used as a tool to measure how government integrate between transport policy and non-transport policy to create sustainability.
4. Empirical Study

4.1. The Overview of Transportation in Jakarta

Jakarta is the capital and largest city in Indonesia. Jakarta, which officially known as Special Capital Region of Jakarta (Indonesian: Daerah Khusus Ibu Kota Jakarta), is one of the biggest Provinces in Indonesia. In 2010, Jakarta have 9,607,787 (BPS, 2010) inhabitants and also have area 662.33 km$^2$ (SK Gubernur No.171/2007) that was divided into 5 administrative cities and 1 administrative regency, that encompasses 44 sub-districts and 267 administrative village. Many Indonesian’s citizen made Jakarta as a barometer of development in Indonesia. With the attribute as modern city of Indonesia, Jakarta was followed by a lot of problems. One of the crucial problems in Jakarta is about transportation.

4.1.1. The History of Transportation in Jakarta

Before 1859, the port of Sunda Kelapa was very crowded with traders from China, India, Japan and the Middle East. Sunda Kelapa became the strategic location to trade from the East to the West, vice versa. This port which is the forerunner to the establishment the city of Jakarta. Over time, to facilitate the flow of goods, it also built the first railroad (1873) between Batavia (ex-Jakarta) - Buitenzorg (Bogor). From the history above can be concluded that since the first forerunner of Jakarta, the outflow of goods and people are very crowded (Rizaldy, 2012).

Before independence of Indonesia, Jakarta 1943 have mass transportation for the first time named Zidosha Sookyoku (ZS). The vehicle was a cart drawn by cow. Moreover, since 1910 Jakarta already has a tram network. This tram was steam train, which operates at an internal city. After the independence of Indonesia in 1945, while in 1960 the first President of Indonesia, Soekarno, eliminated the operational of tram. Because it was not appropriate to operate in Jakarta. This condition was not balanced by providing bus as public transport since 1920’s. In 1970, the growth of private vehicle was getting increase significantly. That was the big transportation revolution in Jakarta. It was also supporting by giving easy and cheap credit system by government of Jakarta.

In 1976, the government of Jakarta established the first electrical railway (KRL) which services in Jakarta, Bogor, Depok, Tangerang and Bekasi area. In the period of Governor Surjadi Soedirdja (1992-1997), Head of DKI Jakarta DLLAJ J. P. Sepang ordered to impose System One Direction (SSA) on a number of roads. And over the time, the construction of roads (flyover or toll road) was developed continuously to offset the growth of private vehicle. In the period of governor Sutioso, the first BRT system was launched in 2004.
4.1.2. Transportation Challenges in Jakarta

The numbers losses will increase gradually as the traffic jams that are getting worse in Jakarta. The high of using private vehicle is the main trigger of congestion problem in Jakarta. In fact, the number of vehicles has reached ± 7.3 million units where 7.25 million (98.8 %) is the private vehicles and 89,270 (1.2 %) is only for public transport. Thus, the average number of vehicle growth at the last five years (2006-2010) is ± 8.0 % per year (Dishub, 2010). Data about condition of transportation in Jakarta can be seen at the table below.

Table 4.1. The Overview Condition of Transportation in Jakarta (Dishub, 2010)

<table>
<thead>
<tr>
<th>Travel Demand</th>
<th>Source: Jica Sitramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Travel demand in DKI Jakarta is 21.9 million (trip/day)</td>
<td>• By using motor vehicle is 15.3 million (trip/day)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The number of Motor Vehicle</th>
<th>Source: Dishub, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In 2010, the number of motor vehicle in DKI Jakarta is ± 7.3 million units</td>
<td>• The number of private vehicle is 7.25 million (98.8 %) and 89,270 (1.2 %) is for public transport</td>
</tr>
<tr>
<td>• The average number of vehicle growth at the last five years (2006-2010) is ± 8.0 % per year</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Modal Share</th>
<th>Source: Dishub, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 98.9 % private vehicle to serve 44 % trip</td>
<td>• 1.2 % public transport to serve 56 % trip (sech as 3 % was served by train (KA/KRL) Jabodetabek)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Road Network</th>
<th>Source: DPU, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The length of road is 6,549 km (including JLNT (non-toll fly over) 57 km)</td>
<td>• Total of broad road os 42.3 km² (6.4 % taken from total area of DKI Jakarta)</td>
</tr>
<tr>
<td>• The growth of road length is only ± 0.01 % per year</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Congestion Cost</th>
<th>Source: Dishub, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Forcasted 4,655.6 million USD / year (vehicles fuel, operational of vehicles, time value, economic value, air pollution)</td>
<td></td>
</tr>
</tbody>
</table>
4.2. Jakarta’s Transport Policy

Jakarta has a policy about pattern of macro transportation which is used for the arrangement of transportation system and handling traffic congestion. This policy was addressed to reduce energy waste generated from each vehicle, reduce pollution, reducing vehicle operating costs, etc. On the other terms, the main goals of macro transportation pattern are increasing efficiency of energy and achieving the effectiveness of mobility. The strategy of macro transport pattern was established as formal regulation by Provincial Government of Jakarta in Peraturan Daerah No. 12/2002 and Peraturan Gubernur No. 103/2007. The overview of macro transport pattern policy can be seen in Figure 4. 2. below.

Figure 4. 1. Travel Mode Changes in DKI Jakarta (Comparative Study in 2002 & 2010) (Cited from Preliminary Figures of JUTPI Commuter Survey 2010)
Figure 4.2. Strategy of Macro Transport Pattern Based on Regulation Peraturan Daerah No. 12/2002 and Peraturan Gubernur No. 103/2007 (cited Dishub, 2010)

Around the end of 2012, Jakarta had the new governor and the vice governor as the result of Jakarta governor election 2012. The new governor, named Jokowi, is representative of the high Jakarta’s people expectation to solve a lot of problem in Jakarta, especially about transport problem. Since his first inauguration, he planned to make some new policies to figure out the extreme congestion in Jakarta. Some new transport policies that the author underlined are:

1. Continuing Jakarta MRT project (mode: train)
2. Finishing TransJakarta’s corridors and adding busses
3. Continuing Jakarta Monorail Project
4. Construct Jakarta Deep Tunnel (multipurpose tunnel: toll road and drainage)
5. Implementation of Electronic Road Pricing
6. Implementation of Odd-even Policy.
4.3. BRT System “TransJakarta”

To reduce congestion in Jakarta, Provincial Government of Jakarta had a plan to develop public transport for Jakarta’s citizen. Based on official website from TransJakarta (www.transjakarta.co.id), the idea to develop Bus Rapid Transit (BRT) in Jakarta came up in 2001 inspired from TransMilenio in Bogota, Colombia. The Governor of Jakarta, Sutiyoso (period 2002-2007), made cooperation with Institute for Transportation & Development Policy (ITDP) to realize TransJakarta as first BRT system in Indonesia. The first corridor of TransJakarta was established in January 15, 2004. In the further, Jakarta planned to build 15 corridors. Recently, in February 14, 2013, the Government of Jakarta just already finished Corridor 12th (Pluit - Tanjung Priok is officially opened) TransJakarta was controlled by Provincial Government of DKI Jakarta.

The development and management system of TransJakarta were provided by The Provincial Government of Jakarta. On the other hand, for the operational bus system, operational ticketing system and other supporting activities were implemented by cooperation between Provincial Government of Jakarta and operators. The government of Jakarta made an agreement with different operators in the different corridors. The operators of TransJakarta in each corridor are: PT. Jakarta Exspress Trans, PT. Trans Batavia, PT. Jakarta Trans Metropolitan, PT. Jakarta Mega Trans, PT. Primajasa Perdanaraya Utama, PT. Eka Sari Lorena Transport, PT Bianglala Metropolitan, PT Trans Mayapada Busway dan PT Perum Damri. But, those operators was handled by main management, Unit Management of Transjakarta Busway.

4.3.1. Corridors

On the master plan of Trans Jakarta, they want to develop 15 corridors. But until now, they still have 12 corridors. There are the eleven corridors:

1. Corridor 1 (Kota - Blok M) (JET, BMP (Sundays only))
2. Corridor 2 (Pulo Gadung 1 - Harmoni) (TB)
3. Corridor 3 (Kalideres - Pasar Baru) (TB), since August 2011 connected with TransJakarta-Tangerang corridor at Kalideres, but the ticket is not integrated (separate) for both corridors
4. Corridor 4 (Pulo Gadung 2 - Dukuh Atas 2) (JTM,PP)
5. Corridor 5 (Ancol - Kampung Melayu) (JMT, LRN)
6. Corridor 6 (Dukuh Atas 2 - Ragunan) (JTM, PP)
7. Corridor 7 (Kampung Melayu - Kampung Rambutan) (JMT, LRN)
8. Corridor 8 (Lebak Bulus - Harmoni) (LRN, PP)
9. Corridor 9 (Pluit - Pinang Ranti) (BMP, TMB, JET (Sundays only))
10. Corridor 10 (Tanjung Priok - PGC 2) (BMP, JET)
11. Corridor 11 (Kampung Melayu - Pulo Gebang), since December 28, 2011 (TMB, DMR)
12. Corridor 12 (Pluit - Tanjung Priok) - (Planned completion scheduled on December 2012 and launched February 14, 2013)
13. Corridor 13 (Blok M - Pondok Kelapa) - (Planned Operation on 2014)
14. Corridor 14 (Manggarai - University of Indonesia) - (Planned Operation on 2015)
15. Corridor 15 (Ciledug - Blok M) - (Planned Operation on 2015)

4.3.2. Buses

The capacity of each bus is 30 seated and 55 standing passengers, though during rush hours these numbers are often exceeded by up to 80 passengers per bus. Each bus is equipped with an electronic board and speakers that announce the name of shelters in two languages, Indonesian and English. Each bus is also equipped with a bi-directional radio transceiver to allow the driver to provide and receive updated information regarding traffic jams, road accidents or lost items. The passenger doors are higher than on normal buses so that passengers can only board from designated shelters. The doors employ automated folding mechanisms which can be manually controlled by the driver. In August 2011, TransJakarta operator has installed cameras on one bus for a trial period. The plan is to install 4 cameras on all buses gradually in efforts to improve services such as to inform passengers waiting for buses about how crowded approaching buses are and prevent sexual harassment on its service.

4.3.3. Shelters

TransJakarta shelters are different from ordinary bus stops. They are usually located in the middle of the road and are reached by elevated bridges. Bus stops are open from 05:00 – 22:00 although opening hours can be extended if there are passengers still waiting at closing time. Shelters often become extremely overcrowded because of long and sometimes unpredictable intervals between buses.
4.3.4. Organizational Structure

The organizational structure of TransJakarta can be seen in the picture below.

![Organizational Structure Diagram](www.transjakarta.co.id)

**Figure 4.3.** Trans Jakarta Organization Structure (www.transjakarta.co.id)

4.4. New Development of Transport Policies in TransJakarta

The following data is about the development of the latest TransJakarta. This data is taken from the Jakarta Transportation Department in 2013 about the development of the BRT system, TransJakarta. Some existing policies already underway and some are still in the planning. Here are some transport policies on developing BRT systems.

4.4.1. Planning of Busway Elevated Corridors

These plans would be treated on the new corridors which are corridor 13, 14 and 15. **Table 4.2.** will show the description about that plan.
Table 4.2. Planning of Busway Elevated Corridors (Dishub, 2013)

<table>
<thead>
<tr>
<th>Corridors</th>
<th>Explanation</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Cileduk – Blok M (14.6 km)</td>
<td>Proposed flyovers constructed (elevated) busway with type 2x1 (2 lane 2 way) is not the type of 2x2 (4-way lane 2).</td>
<td></td>
</tr>
<tr>
<td>14. Kali Malang – Blok M (17.7 km)</td>
<td>ROW discussion is being conducted by the Directorate General of Highways and Ministry of Public Works.</td>
<td></td>
</tr>
<tr>
<td>15. Depok – Manggarai (17 km)</td>
<td>Technically coincide with the trace of 6 (six) toll roads in the city segment Pasar Minggu - Casablanca, so it is proposed that busway corridors Depok - Manggarai dedicated to passed on the highway in the city segment Pasar Minggu – Casablanca</td>
<td></td>
</tr>
</tbody>
</table>

4.4.2. Construction of Busway Separators in 2012

The construction of busway separators has been constructed on corridor 5 and 6 in 2012. It can be seen at Figure 4.4. below.

Figure 4.4. Separators Construction in Corridors 5 and 6 (Dishub, 2013)
4.4.3. Implementation of Bus Tracking System (BTS)

There is now connected with 3 corridors of TransJakarta. Technically, working system of BTS is tracking buses that obtained from satellite (longitude and latitude data). By using GPS and internet connection, in every 5 second of buses update position is sent to Central Control Room. From Central Control Room, data about update position is provided to the timeline board in every corridors. And passengers can access it to guide their trip by using TrasJakarta.

4.4.4. Adding New Busses

Adding new busses was equipped with automatic fire suppression, CCTV, Global Position System (GPS), announcer and automatic display. Total target of adding busses is 234 units and 102 busses has been added since January, 2013. This policy will be supporting Odd-even Policy which it will be held in the middle of 2013. These are the figures of new busses.

![Image of bus interior with passengers]

*Figure 4. 5. Adding New Busses (Dishub, 2013)*

4.4.5. Development of TransJakarta’s Feeder

The aim of feeder development are: (1) providing integrated public transport services by using TransJakarta Busway, other transport modes, and centers of activity; (2) using of private vehicles (private cars and motorcycles) would change to use feeder transportation and TransJakarta Busway. Provincial Department of Transportation DKI Jakarta has developed Integrated Busway Feeder System which it can integrate from public area, bus station, central activities area, and residences.

Implementation of TransJakarta’s feeder has been launched on September, 28, 2013 in 3 routes (Dishub, 2013), there are: (1) Sentra Primer Barat (Feeder Busway Origin), (2) Tanah Abang – Balai Kota (Feeder Busway Destination), (3) Sudirman Central Business District (SCBD) / Senayan (Feeder Busway Destination). And for next steps project, feeders would be launched in following routes. There are: (1) Kawasan Kelapa Gading – Yos Sudarso; (2) Kawasan Muara Angke – Muara Karang; (3) Cibubur – Cililitan; (4) Kebayoran Lama – Ratu Plaza; and (5) other locations with the high travel demand.
4.4.6. Development of Border Integrated Transport System (APTB) with TransJakarta

The purposes of implementation Border Integrated Transport System with TransJakarta are: (1) providing an integrated public transport services for the buffer zone to Jakarta and / or vice versa; (2) using of private vehicles (private cars and motorcycles) would change to use APTB and TransJakarta Busway. Those modes would connect outside area of Jakarta to the central of Jakarta. The nearest outside areas from Jakarta are Depok, Bogor, Tangerang and Bekasi. It was needed a good cooperation between both governments to create an integrated transport system. And several agreements have been made between the Government of DKI Jakarta with several local authorities outside of Jakarta.

This policy would engage a lot instruments. Some important instrument is engaging regular public transport (medium bus) “KOPAJA AC” to support the implementation of APTB policy. APTB also can access “direct service” which APTB busses can access the facilities of TransJakarta (such as: shelters, bus way, etc) directly. Thus, passengers from the outside area of Jakarta can use this facilities properly and they can go easily to Jakarta without using their private vehicles. This is the appearance of APTB busses (see Figure 4.5).

![Figure 4.6: The Appearance of APTB Busses (Dishub, 2013)](image)

4.5. Sustainable Transport in Freiburg, Germany

Freiburg has 220,000 inhabitants and is the economic, cultural, and political center of the Black Forest region in southwestern Germany. The region has a population of 615,000 and is less than an hour’s travel from Switzerland and France (Gutzmer, 2006). Freiburg’s economy is based on tourism, university teaching and research, government and church administration, and a broad range of services provided to the surrounding region (City of Freiburg 2009b).
Based on Buehler & Pucher (2011), they mentioned that from 1950 to 1970, motorization grew rapidly in Freiburg and was higher than for West Germany as a whole. After the policy reversal in the early 1970s, the automobile ownership rate in Freiburg grew slower than the German average. As shown in Figure 2, the motorization rate did not increase at all between 1990 and 2006, remaining at 420 cars per 1,000 inhabitants – 23% below the German average in 2006 (City of Freiburg 2008c). While motorization levels stagnated, car use decreased. Between 1982 and 2007, the car share of trips in Freiburg fell from 38% to 32% during a period in which the car’s mode share was increasing rapidly almost everywhere else in the world (Bratzel 1999; City of Freiburg 2008f; University of Dortmund 2001). At the same time, the bike share of trips in Freiburg almost doubled, from 15% to 27%, and public transport’s share of trips rose from 11% to 18% (see Figure 4.8).

![Figure 4.7. Trend in cars and light trucks per 1,000 population in Freiburg, Germany, and the USA, 1950–2006. (BMVBS 1991–2008; City of Freiburg 2009b, FHWA 1990–2008)](image-url)
Figure 4.8. Trend in percent of trips by car, public transport, bicycle, and foot in Freiburg, 1982–2007. (City of Freiburg 2007c; University of Dortmund 2001)

Figure 4.9. Share of trips by public transport, cycling, and walking in Freiburg and cities of comparable population size (200,000) in Europe and North America, 2006=2007. (City of Freiburg 2007c; Gutzmer 2006; Socialdata 2009; Statcan 2009; U.S. Census Bureau 2009)
The trends away from car use and toward more sustainability in Freiburg occurred in spite of strong population growth, rising incomes, and a booming economy. From 1990 to 2007, Freiburg’s population increased six times faster than the German average (17% vs. less than 3%). Employment in Freiburg grew at three times the overall German rate from 1996 to 2005 (11% vs. 4%; INKAR 2005). In 2005, per-capita income in Freiburg was 29% higher than for Germany as a whole (435,200 vs. 427,200). Freiburg’s economy has profited from its increasing focus on sustainability. Since the early 1980s, Freiburg has fostered the development of its environmental, solar, and biotechnology industries. By 2007 Freiburg had become Germany’s leader in green industries, with 1,500 companies employing roughly 10,000 people and contributing approximately 4500 million to the local economy annually (City of Freiburg 2009a).

Economic success and widespread political support for sustainability made changes in Freiburg’s transport and land-use policies possible. Since the 1970s, the city has increasingly restricted car use while improving public transport, cycling, and walking. That combined carrot-and-stick approach has been crucial to generating public and political support for sustainable transport. Perhaps most important, car restrictive measures are not viewed as punitive, since car users are offered safe, convenient, and affordable alternatives.

4.5.1. Integrating Transport and Land-Use Planning in Freiburg

Freiburg’s old town was almost completely destroyed in bombing raids during the Second World War. That was the beginning of Freiburg’s remarkable history of transport and land-use planning. In 1948, Freiburg’s city administration decided to rebuild the city center in its historic compact form. Most of Freiburg’s post-war population growth, however, was accommodated in new settlements at the fringe of the existing city (Pucher and Clorer 1992).

Land-use plans gave priority to new green field developments with wide streets and ample car parking. Even the old town was adapted to the automobile—with new parking lots on historic squares and a direct highway connection from downtown to the Autobahn. During this time, car ownership and use increased, and so did air pollution, traffic fatalities, and traffic congestion (Gutzmer 2006; Pucher and Clorer 1992).

In 1979, Freiburg’s second integrated transport plan focused on environmental protection and sustainable development. The new plan favored public transport, walking, and cycling over the automobile and called for the integration of transport and land-use planning. Priorities for land-use policies shifted accordingly. The land-use plan of 1981 prescribed that new development was to be concentrated along public transport corridors, especially the city’s expanding light rail system, whose first new line opened in 1983 (Blatter 1995; City of Freiburg 2008b; Hilliard 2006).
During the 1980s, the city council—encouraged by neighborhood associations—voted to traffic-calm all residential neighborhoods to 30 km/hr and to discourage through traffic in residential areas (Blatter 1995). In Vauban, an old French military base, Freiburg has taken one step further and is usually called the “car-free”, or “car-reduced” district. Officially, there are only 80 cars per 1000 inhabitants, but there are reasons to doubt this number. As a garage is not included in the house, people who owns a car need to buy a parking lot in large parking buildings in the outer part of Vauban or park it in a village outside of Vauban. These are not included in the statistics (Arpi & Herö, 2008). Most daily shopping trips of Vauban residents are by walking or cycling and occur within the neighborhood itself (Forum Vauban 2009).

Freiburg’s most recent land-use and transport plans of 2008 were developed simultaneously and are fully integrated. Both reiterate the earlier goals of reducing car use, but they are more explicit about prohibiting car-dependent developments and actively support car-free neighborhoods. The plans focus on compact development along light rail routes, strengthening local neighborhood commercial and service centers, and mixing housing with stores, restaurants, offices, schools, and other non-residential land uses (City of Freiburg 2008b).

4.5.2. Improvements in Public Transport

Since the opening of the first new light rail line in 1983, Freiburg has added four new lines with a total extent of 36.4 km in 2008 (City of Freiburg 2009b). During the same period, the supply of light rail service almost tripled (from 1.1 to 3.2 million vehicle km). In 2006, 65% of Freiburg’s residents and 70% of all jobs were located within easy walking distance (300 meters) from a light rail stop (City of Freiburg 2008f).

These policies were complemented with an attractively priced, unified ticketing system, which enables riders to use a single ticket for several trip segments and different types of service. In 1984, Freiburg’s public transport system offered Germany’s first monthly ticket transferable to other users—called the “environmental ticket” (Bratzel 1999; Hilliard 2006). In 1991, the geographic coverage of the “environmental ticket” was expanded to include the two adjacent counties (ZRF 2008). These monthly tickets have offered bargain fares for regular public transport users for unlimited travel within the entire region (Gutzmer 2006; RVF 2006). The percentage of public transport riders using monthly tickets rose from only 39% in 1974 to 92% in 2006 (RVF 2006; RVG 2008d).

In summary, Freiburg and its surrounding region significantly increased the quantity and quality of public transport services. A higher share of trips by public transport has increased its financial sustainability and reduced CO₂ emissions. Since January 1, 2009, Freiburg’s light rail system runs solely on electricity generated by wind, solar, and water power, thus further decreasing the carbon footprint of transport in Freiburg (Buehler & Pucher, 2011).
4.5.3. Promoting Bicycling and Walking for Short Trips

The total number of bike trips in Freiburg nearly tripled between 1976 and 2007: from 69,500 to 211,000—almost one bike trip per inhabitant per day (City of Freiburg 2008f; Pucher and Clorer 1992; University of Dortmund 2001). Cyclists can ride on separate facilities and safe, lightly traveled streets between virtually any two points in the city. Traffic calmed neighborhood streets and home zones encourage more cycling and walking and make them safer (Herrstedt 1992; Morrison, Petticrew, and Thomson 2003; Tolley 2003; Webster and Mackie 1996).

Over the past three decades, the city has been increasing the supply of bike parking, improving its quality, and integrating it with public transport stops. Between 1987 and 2009, the number of bike parking spaces in the city center almost tripled, rising from 2,200 to 6,040 (City of Freiburg 2008a, 2008f; Gutzmer 2006). Not only does the city provide bike parking directly, but it also requires bike parking in all new buildings with two or more apartments, as well as schools, universities and businesses (City of Freiburg 2008d).

Freiburg has encouraged walking primarily through the car-free zone in the center, traffic calming of residential streets, and compact new developments that generate short, walkable trips (City of Freiburg 2008b). Walking in Freiburg’s pedestrianized old town has been thriving, with 69% of all trips on foot in 2007. The city acknowledges that its policies so far have only succeeded in stabilizing overall walking levels. In the future, Freiburg plans to improve the connectivity and safety of its citywide pedestrian network and intends to establish more pedestrian friendly neighborhood centers.

4.5.4. Restrictions on Car Use

Many of the policies that promote public transport, bicycling, and walking involve restrictions on car use—such as car-free zones and traffic-calmed neighborhoods. Freiburg’s official goal is to reduce car use as much as practical, but to selectively accommodate car trips that cannot be made by any other mode. Thus, the city combines disincentives to car use in the town center and residential neighborhoods with improvement of arterials that have been widened or altered in various ways to increase their carrying capacity (City of Freiburg 2008f; Gutzmer 2006).

Freiburg’s parking policy is designed to make car use less convenient and more expensive. Parking garages are relegated to the periphery of the city center, thus forcing motorists to walk or take public transport to access their cars. In many residential neighborhoods, parking is reserved for residents only and requires a special permit. On-street parking in commercial areas of the city becomes more expensive with proximity to the center: 42.20 per hour in the innermost zone, 41.60 per hour in the intermediate zone, and 4.60 per hour in the outermost zone (City of Freiburg 2006, 2008f).
Almost all on-street car parking is limited in duration to prevent long-term parking by commuters. Building codes have reduced parking requirements for cars in new residential developments at the same time they increased parking requirements for bikes (City of Freiburg 2008e).

### 4.5.5. Seven Lessons for Implementing Sustainable Transport Policies

Based on Buehler & Pucher (2011), they have identified seven lessons that have been taken from implementation of sustainable transport policy in Freiburg. There are:

1. **Implement Controversial Policies in Stages**

   Freiburg implemented most of its policies in stages, often choosing projects everybody agreed upon first. For example, residential traffic calming was initially implemented in neighborhoods whose residents complained most about car travel. Successful implementation in one neighborhood encouraged other areas of the city to request traffic calming as well.

2. **Plans Should be Flexible and Adaptable over Time to Changing Conditions**

   Over the last 40 years, Freiburg phased and adjusted its policies and goals gradually over time. For example, the initial decision to stop abandoning the trolley system was made in the late 1960s. In the early 1970s, the city council approved the extension of the light rail system—which finally opened in 1983.

3. **Policies Must be Multi-Modal and Include Both Incentives and Disincentives**

   Freiburg has simultaneously made public transport, cycling, and walking viable alternatives to the automobile, while increasing the cost of car travel. Improving quality and level of service of alternative modes of transport made car-restrictive measures politically acceptable.

4. **Fully Integrate Transport and Land-Use Planning**

   Policies promoting public transport, cycling, and walking rely on a settlement structure that keeps trip distances short and residences and workplaces within reach of public transport.

5. **Citizen Involvement Must be an Integral Part of Policy Development and Implementation**

   Since the 1970s, citizen participation has been a key aspect of transport and land-use planning in Freiburg. For example, citizen groups worked with the city administration to redevelop Vauban into an environmentally
friendly car-free neighborhood. Moreover, Freiburg’s latest land-use plan has been developed with sustained input of 900 citizens. Citizen involvement and public discourse kept the environment and sustainability of the transport system in the news in Freiburg for decades.

6. Support From Higher Levels of Government is Crucial to Making Local Policies Work

Starting in the 1970s, the German federal government reduced funding for highways and provided more flexible funds for improvements in local transport infrastructure—including public transport, walking and cycling.

7. Sustainable Transport Policies Must be Long Term, with Policies Sustained Over Time, for Lasting Impact

Changes in the transport system and travel behavior take time. Freiburg started its journey towards more sustainable transport almost 40 years ago. For example, the initial expansion of the light rail system took over a decade. Thus, planners should curb their expectations for quick success. Clearly, some policies can be implemented quickly, but changes in travel behavior and a more sustainable transport system take much longer.

4.6. Summary of Empirical Study

The conclusion of this empirical study broadly present as a story of sustainable transport development in Jakarta and Freiburg. The history of transportation in Jakarta become reflection how Jakarta has developed sustainable transportation since 1940s. Then, the main strategy about “Strategy of Macro Transport Pattern in Jakarta” (Dishub, 2010) was seen as a basic strategy to begun sustainability. One of the implementation of “macro strategy” is about developing BRT system, TransJakarta. Thus, the author takes TransJakarta as a model to represent sustainable public transport for the present and future generation. That’s why this empirical study showed profile and purposued planning about TransJakarta.

As a comparative study, Freiburg was showed as “sustainable transport” model that could be implement in Jakarta as well. Therefore, the author takes a part in this empirical study about how Freiburg made integrated transport and land-use, how Freiburg improve its public transport, how Freiburg promoted bicycle and walking, and how Freiburg made policy restriction about car use. The seven lesson study (Buehler & Pucher, 2011) about Freiburg become the last important reflection how to create and integrate sustainable transport in Freiburg.
5. Discussion and Analysis

5.1. Improving New Transport Policies to Create Sustainable Public Transit

This analysis would emphasize how the new policy create sustainable public transit which can achieve effective and efficient way. Actually, there are a lot of solutions to figure out transport problem related creating sustainable public transport. Because sustainable transport covered wide sectors. Thus, the author focuses in new transport policies that government of Jakarta has been taken to develop BRT system to create sustainable and integrated public transit. We agree as Sebhatu et al (2011) mentioned that to provide better service and efficiency, public transport must take account of sustainable thinking based on environmental, eco-efficiency and social sustainability and involve all stakeholders.

Taken lesson from a lot of countries about improving sustainable transport, especially in Freiburg, it makes understand what the meaning of sustainable public transport is. But, we cannot generalize that development of sustainable public transport in one country represent all countries worldwide. Because, every country has different history and background related to improve sustainable transport. Especially in Jakarta, the main focus of government is “reducing traffic congestion”. The stage of creating sustainable public transport hasn’t to be the main focus of transport problem solving. Therefore, this analysis framework begun from the really Jakarta needs to figure out its transport’s problem. This framework also has been fitted with the Jakarta’s new instruments related decision making in sustainable transport policy. We use three main keys in policy field to create sustainable transport that can be used to mitigate negative environmental impacts (Greene & Wegener, 1997).

5.1.1. Implementing Transport Technology

Technology is something that continues to developing over time. In the service science, technology is just become the medium to offers an opportunity to provide new and innovative services from producer to customers. “Technology is only the medium for a new service” (Sundbo 1997, p. 436). In environmental issues, technology can be used as a tools to reduce and “mitigate environmental impacts” (Greene & Wegener, 1997).

Implementation of technology in transport field would be an important key to create sustainability. By using technology properly, emission from motor vehicles can be controlled well. Technologies such as the three-way catalytic converter, multi-point fuel injection, computer control of combustion, and others have reduced motor vehicle emissions rates per kilometer by more than an order of
magnitude since the 1960s (US Department of Transportation, Bureau of Transportation Statistics, 1996, Chapter 7). In the recent decade, developing of technology in transport field cannot be rejected to create sustainability. Because technology improvement has a wide aspect for to develop in transportation.

Technology also has a big influence to determine mobility. That’s why Stead and Banister (2001) categorized that “technology” is one of the four main influences to determine mobility. The author argues that technology can be categorized a transport policy which has direct impact related to transportation, or it can be categorized as non-transport policy (Stead and Banister, 2001) which does not have direct transportation impact. Implementation of technology in transport policy related for creating sustainable transport, such as: information technology timetable in public transport which can be used by passenger to know the departure or arrival time in choosing route, implementation of the use of hybrid public transport which can reduce emission from motor vehicles, etc. And improving technology in non-transport policy as Stead and Banister (2001) mentioned, that it likes: e-commerce, teleconferencing and route guidance system.

Based on Strategy of Macro Transport Pattern which concluded in Regulation Peraturan Daerah No. 12/2002 and Peraturan Gubernur No. 103/2007 (Dishub, 2010), Jakarta just only have three kind of implementation technologies which have direct impact to transportation. There are: (1) Applying of ERP (Electronic Road Pricing); (2) Applying of ITS (Intelligent Transport System); and (3) Developing of public transport in MRT, LRT and BRT which every section has development of technology itself. In development of technology in BRT system, the author identified that the purposed transport policy about implementation of technology is about applying Bus Tracking System (BTS) which means that passengers can know the update time of departure or arrival of the busses properly. There are no any integrated transport strategies in technology development related to providing sustainable transport. Government didn’t have policy restriction to create technology as a tool to maintain environment from pollutions in transportation field.

In contrast, since the early 1980s, Freiburg has fostered the development of its environmental, solar, and biotechnology industries. By 2007, Freiburg had become Germany’s leader in green industries, with 1,500 companies employing roughly 10,000 people and contributing approximately €500 million to the local economy annually (City of Freiburg 2009a). The federal transport law is currently being revised for renewal, but indications are that there will be even more emphasis on promoting sustainability. That includes improvement to motor vehicle technology as well as policies to encourage public transport, walking, and bicycling. In 1984, Germany had established “environmental ticket” as the first transferable flat-rate monthly transport ticket including Freiburg area (Buehler & Pucher, 2011).
Hence, Freiburg has been earlier to give an “alert” to all company industries to aware about environmental maintenance, particularly in transportation. But, in the early of 1970s, Jakarta instead supported the increasing of private vehicle (private car revolution) easily by providing an easy credit system to private car ownership. Indeed, technology has helped people doing something easily. But, the using of technology should be faced as a tool to keep the sustainability for the present and future generation (sustainability).

5.1.2. Adding Transport Supply Proportionally

As the definition came up from Greene & Wegener (1997), they defined that transport supply in the form of highway networks or levels of service offered by private carriers or public transport operators is subject to government control and therefore potentially an ideal policy instrument to influence transport demand. Supply and demand in transportation is a unity that cannot be separated from one with other one. Hence, transport supply is always following transport demand. For instance, the government as main controller of public transport would follow the transport demand from passengers by providing appropriate busses. But, adding busses is not always become efficient way to achieve customer satisfaction. It needs to fit with balancing what the really passengers want (subjective measurement).

Adding transport supply is not only about construct transport infrastructures. But increasing service levels is also become the important key to create sustainable public transport. Public transportation represents a complex service system that is based on “value-co-production configuration of people, technology, other internal and external service systems, and shared information” (Spohrer et al., 2007). By complexity of services, the government or PTA (Public Transport Authority) can innovate to provide the new way of services to the passengers (customers), because innovation is essential for sustainable achievement (Nidumolu et al., 2009).

Regarding the identification from Strategy of Macro Transport Pattern which concluded in Regulation Peraturan Daerah No. 12/2002 and Peraturan Gubernur No. 103/2007 (Dishub, 2010) and the newest transport policy to develop Jakarta BRT system, almost all policies are about constructing transport infrastructures. Whereas, costumers satisfaction is not only can be determined by providing goods-dominant logic but also the crucial thing is also service-dominant logic (Vargo and Lusch, 2008). PTA also can integrate all resources in public transport (BRT system) in order to provide better service. This allows for the co-creation of value (Vargo and Lusch, 2008) and of systems that can be applied to meet the challenges posed by climatic and environmental crises (Leggewie and Welzer, 2009). Hence, having Minimum Service Standard (MSS) is one of the important requirement to achieve sustainability in public transport. Because that document consists of how to measure customer satisfaction by using service parameter to provide better service. MSS was defined as the minimum level of services that should provide to the passengers to make passengers satisfied with its services.
Since the first establishment in 2004, TransJakarta did not have Minimum Service Standard (Wismantyoko, 2012) to provide better service in public transport. Minimum Service Standard in TransJakarta BRT system can be concluded as: reliability of services (punctuality, appropriate headway, minimum limitation of bus speed and time travelling), safety, accessibility, affordable and also comfortable. Hence, having MSS is one of the important requirement to achieve sustainability.

Based on the result on author’s investigation, TransJakarta did not have MSS due to the form of TransJakarta was still as Unit Management under Provincial Department of Transportation. Which is good, but some time it needs more complicated bureaucracy to process Minimum Service Standard. That is different with MRT project which formed as Regional-Owned Enterprises (BUMD-Indonesian) which formed under Governor of Jakarta directly. BUMD form is more flexible to explore service and organization management because it doesn’t have any relationship with Department of Transportation directly.

Adding transport supply in creating sustainable transport in Freiburg was responded as providing integrated public transport. Since the opening of the first new light rail line in 1983, Freiburg has added four new lines with a total extent of 36.4km in 2008 (City of Freiburg 2009b). Freiburg expanded its transport network regarding the land-use planning to create integrated public transport. In 2006, 65% of Freiburg’s residents and 70% of all jobs were located within easy walking distance (300 meters) from a light rail stop (City of Freiburg 2008f). In 1991, the geographic coverage of the “environmental ticket” was expanded to include the two adjacent counties (ZRF 2008). These monthly tickets have offered bargain fares for regular public transport users for unlimited travel within the entire region (Gutzmer 2006; RVF 2006). The percentage of public transport riders using monthly tickets rose from only 39% in 1974 to 92% in 2006 (RVF 2006; RVG 2008d).

5.1.3. Reducing Transport Demand

Based on Greene & Wegener (1997), transport demand results from the physical separation of human activities which, in turn, is made possible by transport supply. As metropolis city, as Jakarta, transport demand is higher than transport demand in rural area. Even though rapid transit system is one of the smart solution to facilitate passengers in the metropolis city, but rapid transit and the cars have facilitated the expansion of metropolitan areas over wider and wider territories with the consequence of ever longer trips and greater volumes of traffic with all their problems of congestion traffic accidents, energy use, pollution and land consumption. In this term, all activities related with transport activities have made metropolitan area become huge area to cover it.

The Figure 5.1. shows that the unbalancing number of road growth between the number of vehicle growth. ITDP (2007) shows that in 1996, there are 355 new vehicles perday, eq to 1.775 meters of road line/day (648 kms / year). And in 2003, there are 138 new vehicles perday, eq to 700 meters of Road Line/day.
(252 kms/year). That’s why, balancing between travel supply and demand become important factors to create sustainability.

![Graph](image)

**Figure 5.1.** Road Width Utilization by Vehicles Growth In Jakarta (ITDP, 2007)

Because of that, transport demand management become the important thing to manage demand properly. Greene & Wegener (1997) mentioned that transport demand management tries to intercept this vicious cycle by policies to reduce the need for travel such as promoting high-density, mixed land use, preferably near transit stations, encouraging the substitution of travel through telecommunication or by granting special privileges to high-occupancy vehicles on motorways. Travel demand management is not only concern for reducing mobility, but also promoting to use public transport.

Creating good travel demand management cannot be imposed for the government as transport authority, but also engaging all stakeholders for providing sustainable public transit. The author argues that is the important role of contract among each party. Contracting is largely connected with the securing of resources, thus acquiring a capacity focus (Ramirez and Wallin, 2000). The role of contract in public transport policy included management as a tool to integrate all stakeholders to provide better public services. The notion of stakeholder management would be as effective way to achieve sustainability. Post et al (2002) have conceptualized stakeholder management using the label stakeholder view, arguing that the implementation of stakeholder management should be seen as an interactive learning process. In TransJakarta case, the government of Jakarta have made an agreement with different operators in the different corridors. Thus, contractual governance for creating efficient and effective management among each party (operator) cannot be delayed any more. Those policies are still concerning to reduce travel demand by providing better demand management.
The other key to reduce travel demand is about integrating non-transport policy (Stead and Banister, 2001) which have relationship with generating mobility. In modern era, a lot of country worldwide have implemented technology as a tool to reduce mobility. For households, the activity of shopping in market area have been substituted with e-commerce (shopping on-line). Which as a buyers didn’t need to come or visit face-to-face but they still can explore and buy all items that they want in website. Teleconference also have replaced as we called direct meeting. The discussion is still can keep running even they didn’t meet face-to-face. Hence, technology have taken important role to reduce mobility worldwide.

The restriction of urban land-use is becoming the important role to determine mobility. Nowadays, Jakarta have complicated land-use mixed arrangement. This condition should be a critical consideration to develop public transport that could be obtained efficiently. One of the newest policy of Jakarta in 2013 is about developing Border Integrated Transport System (APTB) with TransJakarta. Which can facilitate passengers in the outside area of Jakarta directly by using TransJakarta and its facilitation. The scenario of implementation of reducing transport demand policy and the role of creating sustainable transport policy can be seen at Figure 5. 2.

In the reducing transport demand, Freiburg has initiative to manage land-use since 1955 which focus on growth and geographical expansion (Buehler &Pucher, 2011). The policies about restriction of car use and promoting bicycle and walking for a short trip are becoming sustainable transport policies to support Freiburg’s strategies in the future. The sustainable policy called “green modes” (walking, cycling and transport) in 1979 become an important investment in the first step of creating sustainability. Two neighborhoods, which are Rieselfeld and Vauban, are the result based on the idea of sustainable development. Thus, integrating transport and land-use planning, improvement in public transport, promoting bicycle and walking, and restriction of car use are modal of sustainability in Freiburg.

5.2. The Role of New Transport Policy in Developing Sustainable and Integrated Public Transport

These following roles was resulted from the identification of the purpose in sustainable public transport achievement. The author founded three roles of new transport policy that can be implemented in Jakarta regarding policy field in creating sustainability (Greene & Wegener, 1997). These roles has been fitted with the empirical study of TransJakarta which government needs to improve in the further. Those important following roles are:
5.2.1. Transport Policy as an Instrument To Reduce Environmental Impact

Integrating sustainable transport policies would reduce environmental impact whether for the present or for the future generation. The author argues that it can be achieved with developing of technology in all sectors in transportation. By using technology effectively, the travelers or passengers still can achieve the efficiency and effectiveness of public transport without compromising the ability of future generations to meet their own needs (Greene & Wegener, 1997), that’s we called it as sustainability.

In the modern era, innovation to create sustainable transport become the important understanding. Nidumolu et al., (2009) mentioned that innovation is essential for sustainable achievement. Whether innovation in the services level or other section, innovation is needed to improve transport policy in pursuing sustainability. Increasing innovation in services would be engaging all resources to create new technology, new network and new procedures integrators. This is parallel as Baron and Harris (2008) mentioned, that service innovations are based on customer-focused S-D logic whereby value is co-created with customers who are resource new technology, new networks and new procedures integrators.

Antara (2009) mentioned that hugest influences of pollution came from transportation sector which is contributing 70% pollution in Jakarta. Thus, nowadays, the main focus of Jakarta’s government is about reducing traffic congestion. Indirectly, reducing traffic congestion have two side impact which are reducing environmental impact and reducing the density of congestion itself. The author argues that the government of Jakarta is being on the right path now. But it needs more firmness to guide these policies in reducing environmental impacts.

The author argues that Freiburg has an awareness about environmental maintenance was earlier then Jakarta. Freiburg has started in 1979 (Second Transport Plan) to emphasize “changed” political and environmental circumstances, the connection of transport and land use, and favors the so-called “green modes” (walking, cycling, and transport) over the car (Buehler & Pucher, 2011). Freiburg believed that sustainability encompassed a lot of sectors to be involved. It needs sustainable transport policy to integrate with other sector in promoting environmental maintenance.

5.2.2. Transport Policy as an Instrument to Increase Service Level

Providing better services is not only from the producer (operator) to the customer (passenger), but also customer can be as co-created service value. Vargo and Lusch (2008) mentioned that value is co-created through such resource integration. Passengers (costumers) would have awareness to be co-creator of services if they satisfied with the services that have been given to them. Passengers would make new network from one community to other community to promote the using of public transport by their own initiatives. As operator
(authority), it can be easier to operate public transport sustainably and it doesn’t need any hard enforcement to promote the using of public transport all of the time. It’s automatically work by its own way. Hence, this can be reached if government of Jakarta have made passengers (customers) satisfied with its services.

The needs of Minimum Service Standard (MSS) establishment is also being the important demand to provide better service in TransJakarta. That document would engage all stakeholders to create better contract, because service sectors covered a lot of instrument to work in which means contract is largely connected with the securing of resources (Ramirez and Wallin, 2000). Thus, transport policy as an instrument to increase service level means that to achieve sustainable public transport, not only needed goods-dominant logic (Vargo and Lusch, 2008) with constructing new transport infrastructure, but also needed providing service-dominant logic (Vargo and Lusch, 2008) which concentrate on how to give better service without adding goods thinking.

Freiburg has increased service level since their established the first public transport. Service, fares, and subsidies for the entire Freiburg region are coordinated by a regional public transport association (ZRF), which serves 625,000 residents in 75 town (Buehler & Pucher, 2011). Improving quality and level of service of alternative modes of transport made car-restrictive measures politically acceptable. Hence, providing better services covered huge area to address the idea of sustainability. On the other hand, citizen participation has been a key aspect of transport and land-use planning in Freiburg, that illustrate that was as a value co-creation to integrated all resources . Vargo and Lusch (2008). And Freiburg has succeed to provide the better service in every section in public transport that have been developed before.

5.2.3. Transport Policy as an Instrument to Create Sustainable Transport Management

This thinking came up from the unbalancing between transport supply and demand in Jakarta recently. Based on Provincial Department of Transportation data (2010), the average number of vehicle growth at the last five years (2006-2010) is ± 8.0 % per year. This condition is unbalance with data of the growth of road, that the length of road is only ± 0.01 % per year (DPU, 2011). If that condition cannot be solved, traffic congestion would be ice ball that rolling and growing bigger every day. Thus, regarding those conditions, creating good management in transport supply and demand would be an important key to create sustainable transport in Jakarta.

Transport supply and demand management would detect how many mobility that generating by passengers. It was included land-use planning policy, e-commerce policy, and the other non-transport policy that influencing mobility. Hence, Greene & Wegener (1997) mentioned that transport demand management tries to intercept this vicious cycle by policies to reduce the need for travel. And only
recently the potential of transport supply management for controlling the growth in mobility has been recognized. Balancing between transport supply and demand management would be critical key to create sustainability in transportation.

Public transport management for creating sustainability is also including providing proportional ticket pricing, taxation, and other policy related with macro-economic policy. Stead and Banister (2001) argued that the use of road transport imposes external costs, such as noise and air pollution and congestion. Thus, better management system or organization would calculate the operational cost of public transport efficiently. Therefore, creating sustainable transport management whether in transport system, organization or in the macro-economic policy was really needed in public transport development of Jakarta.

Freiburg has proved the successful of the history of creating sustainable transport. Those reasons are supported with understanding of the important good management in every section of transport field. These evidences can be seen in how Freiburg was struggling to get the support from higher level of Germany federal government to make local policies work with the national strategy in creating sustainable transport. That’s why Freiburg and federal government established Zweckverband Regio-Nahverkehr Freiburg (ZRF) as a public institution and ti was founded in 1994 by the county of Breisgau-Hochschwarzwald, county of Emmendingen and the city of Freiburg (Regio-Verbund).
Figure 5.2. Scenario of Improving New Transport Policy to Create Sustainable Public Transport
5.3. **Hypothesis Testing Results**

In this study, the author tests the hypothesis of scenario of improving new transport to create sustainable public transport with the spreading of questionnaires. The respondents were chosen for who have experiences of TransJakarta or Jakarta’s citizen, they have high level of education, and their occupation as civil servant at transport department or ministry of transportation. The respondents are:

1. Civil servant at Ministry of Transportation Indonesia
2. Civil servant at Transport Department of Jakarta
3. Lecture
4. Student of Master Degree or Doctoral Degree

The total number of respondents is 42 respondents. The number of total sample (replication) has been chosen by using the method of Experimental Sampling Technique (Supranto, 2000). According Supranto J (2000) for experimental studies with random design complete, or factorial randomized block, it can simply be formulated:

$$(t-1) (r-1) \geq 15$$

Note:  
$t$ = the number of treatment  
$r$ = the number of replication

Because the number of treatment for the questioner is 5 options, thus this number of total sample (replication) was calculated like this:

$$(t-1) (r-1) \geq 15$$

(5-1) (r-1) $\geq 15$

(r-1) $\geq 15/4$

$r \geq 4.75$

Hence, the number of total sample (replication) $r \geq 4.75$, it means that 42 respondents is valid as the number of total sample (replication). The percentage of respondents was shown as the following figures.
The hypothesis testing result was conducted to know how far the respondents support on creating sustainable transport policy in Jakarta, especially on TransJakarta Busway. To know the list of questions for the respondents, it can be seen at the Table 5.1.

Table 5.1. List of Questioner

<table>
<thead>
<tr>
<th>No.</th>
<th>List of Questioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Creating sustainable transport through the implementation of existing transport policy in Jakarta</td>
</tr>
<tr>
<td>2.</td>
<td>Creating sustainable transport policy through the establishment of TransJakarta Busway in Jakarta</td>
</tr>
<tr>
<td>3.</td>
<td>Creating sustainable transport policy through the implementation of transport technology in Jakarta</td>
</tr>
<tr>
<td>4.</td>
<td>Creating sustainable transport policy through the policy to adding transport supply proportionally in Jakarta</td>
</tr>
<tr>
<td>5.</td>
<td>Creating sustainable transport policy through the policy to reducing transport demand in Jakarta</td>
</tr>
<tr>
<td>6.</td>
<td>Creating sustainable transport policy through the implementation of e-commerce in Jakarta</td>
</tr>
<tr>
<td>7.</td>
<td>Creating sustainable transport policy through the implementation of ITS (Intelligent Transport System) in Jakarta</td>
</tr>
<tr>
<td>No.</td>
<td>List of Questioners</td>
</tr>
<tr>
<td>-----</td>
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<tr>
<td>8.</td>
<td>Creating sustainable transport policy through the implementation of ICT (Information Communication Technology) in Jakarta</td>
</tr>
<tr>
<td>9.</td>
<td>Creating sustainable transport policy through the implementation of ERP (Electronic Road Pricing) in Jakarta</td>
</tr>
<tr>
<td>10.</td>
<td>Creating sustainable transport policy through the policy to increasing service innovation in TransJakarta</td>
</tr>
<tr>
<td>11.</td>
<td>Creating sustainable transport policy through the implementation of Minimum Service Standard in TransJakarta</td>
</tr>
<tr>
<td>12.</td>
<td>Creating sustainable transport policy through the policy to increasing service level of TransJakarta</td>
</tr>
<tr>
<td>13.</td>
<td>Creating sustainable transport policy through the policy to increasing transport infrastructure in Jakarta</td>
</tr>
<tr>
<td>14.</td>
<td>Creating sustainable transport policy through the implementation of Intellegent Parking System in Jakarta</td>
</tr>
<tr>
<td>15.</td>
<td>Creating sustainable transport policy through the policy to expand bicycle and pedestrian in Jakarta</td>
</tr>
<tr>
<td>16.</td>
<td>Creating sustainable transport policy through the policy to balancing of travel supply and demand in Jakarta</td>
</tr>
<tr>
<td>17.</td>
<td>Creating sustainable transport policy through the policy to restrain private car usage in Jakarta</td>
</tr>
<tr>
<td>18.</td>
<td>Creating sustainable transport policy through the policy to create good organizational management in TransJakarta</td>
</tr>
<tr>
<td>19.</td>
<td>Creating sustainable transport policy through the policy to create good service management in TransJakarta</td>
</tr>
<tr>
<td>20.</td>
<td>Creating sustainable transport policy through the policy to create good land-use planning in Jakarta</td>
</tr>
</tbody>
</table>

*Source: Primary Data Analysis, 2013*

The survey was conducted with the close sampling method which means the respondents have been provided the optional answer. The optional answers are:
1. Very agree
2. Agree
3. Moderate
4. Disagree
5. Very disagree

To know the response of the respondents about how far the establishment of TransJakarta Busway on creating sustainability, we will see in the Figure 5.5.

Figure 5.4. Responds of the Implementation of Existing Transport Policy on Creating Sustainable Transport Policy in Jakarta

Source: Primary Data Analysis, 2013

To know response of the respondents about how far the establishment of TransJakarta Busway on creating sustainability, we will see in the Figure 5.5.
Figure 5.5. Responds of the Establishment of Transjakarta Busway on Creating Sustainable Transport Policy in Jakarta

To see response of the respondents about creating sustainable transport policy through the implementation of transport technology in Jakarta, can be seen in the Figure 5.6.

Figure 5.6. Responds of the Implementation of Transport Technology on Creating Sustainable Transport Policy in Jakarta
To know response of the respondents about creating sustainable transport policy through the policy to adding transport supply proportionally in Jakarta can be seen in the Figure 5. 7.

![Pie Chart](image1.png)

Source: Primary Data Analysis, 2013

**Figure 5. 7.** Responds of the Policy to Adding Transport Demand Proportionally on Creating Sustainable Transport Policy in Jakarta

In the Figure 5. 8 we can see response of the respondents about creating sustainable transport policy through the policy to reducing transport demand in Jakarta.

![Pie Chart](image2.png)

Source: Primary Data Analysis, 2013

**Figure 5. 8.** Responds of the Policy to Reducing Transport Demand on Creating Sustainable Transport Policy in Jakarta

In the Figure 5. 9. we can see response of the respondents about creating sustainable transport policy through the implementation of e-commerce in Jakarta.
To know response of the respondents about creating sustainable transport policy through the implementation of ITS (Intelligent Transport System) in Jakarta, we can see at the Figure 5. 10.

In the Figure 5. 11, we see response of the respondents about creating sustainable transport policy through the implementation of ICT (Information Communication Technology) in Jakarta.
Figure 5.11. Responds of the Implementation of ICT on Creating Sustainable Transport Policy in Jakarta

To know response of the respondents about creating sustainable transport policy through the implementation of ERP (Electronic Road Pricing) in Jakarta we see at the Figure 5.12.

Figure 5.12. Responds of the Implementation of ERP on Creating Sustainable Transport Policy in Jakarta
In the Figure 5.13 we can see response of the respondents about creating sustainable transport policy through the policy to increasing service innovation in TransJakarta.

Source: Primary Data Analysis, 2013

**Figure 5.13.** Responds of the Policy to Increasing Service Innovation on Creating Sustainable Transport Policy in TransJakarta

To know response of the respondents about creating sustainable transport policy through the implementation of Minimum Service Standard in TransJakarta, we can see in the Figure 5.14.

Source: Primary Data Analysis, 2013

**Figure 5.14.** Responds of the Implementation of Minimum Service Standard on Creating Sustainable Transport Policy in TransJakarta
To see response of the respondents about creating sustainable transport policy through the policy to increasing service level of TransJakarta, we see in the Figure 5. 15.

![Pie Chart](image1)

*Source: Primary Data Analysis, 2013*

**Figure 5. 15.** Responds of the Policy to Increasing Service Level on Creating Sustainable Transport Policy in TransJakarta

In the Figure 5. 16, we can see response of the respondents about creating sustainable transport policy through the policy to increasing transport infrastructure in Jakarta.

![Pie Chart](image2)

*Source: Primary Data Analysis, 2013*

**Figure 5. 16.** Responds of the Policy to Increasing Transport Infrastructures on Creating Sustainable Transport Policy in Jakarta
To know response of the respondents about creating sustainable transport policy through the implementation of Intelligent Parking System in Jakarta, we can see at the Figure 5.17.

Figure 5.17. Responds of the Implementation of Intelligent Parking System on Creating Sustainable Transport Policy in Jakarta

In the Figure 5.18, we can see response of the respondents about creating sustainable transport policy through the policy to expand bicycle and pedestrian in Jakarta.

Figure 5.18. Responds of the Policy to Expand Bicycle and Pedestrian on Creating Sustainable Transport Policy in Jakarta
In the **Figure 5. 19**, we see response of the respondents about creating sustainable transport policy through the policy to balancing of travel supply and demand in Jakarta.

![Figure 5. 19](image)

**Source:** Primary Data Analysis, 2013

**Figure 5. 19.** Responds of the Policy to Balancing of Travel Supply and Demand on Creating Sustainable Transport Policy in Jakarta

To know response of the respondents about creating sustainable transport policy through the policy to restrict private car usage in Jakarta, we see at the **Figure 5. 20**.

![Figure 5. 20](image)

**Source:** Primary Data Analysis, 2013

**Figure 5. 20.** Responds of the Policy to Restrict Private Car Usage on Creating Sustainable Transport Policy in Jakarta
In the **Figure 5. 21**, we can see response of the respondents about creating sustainable transport policy through the policy to create good organizational management in TransJakarta.

![Figure 5.21](image)

*Source: Primary Data Analysis, 2013*

**Figure 5. 21.** Responds of the Policy to Create Good Organizational Management on Creating Sustainable Transport Policy in TransJakarta

To know response about creating sustainable transport policy through the policy to create good service management in TransJakarta, we see in the **Figure 5. 22**.

![Figure 5.22](image)

*Source: Primary Data Analysis, 2013*

**Figure 5. 22.** Responds of the Policy to Create Good Service Management on Creating Sustainable Transport Policy in TransJakarta

To see responses about creating sustainable transport policy through the policy to create good land-use planning in Jakarta, we can see in the **Figure 5. 23**.
From the hypothesis testing result by spreading questioners for the respondents, the author measure the number of most supporting sustainable transport policy which asked for respondents. The parameter to measure the number of most supporting sustainable transport policy is respondents who answer with VERY AGREE. The result can be seen at the Figure 5. 24.

**Figure 5. 23.** Responds of the Policy to Create Good Service Management on Creating Sustainable Transport Policy in TransJakarta

**Figure 5. 24.** The Most Supporting Sustainable Transport Policy by Answering VERY AGREE
At the Figure 5.24. above, the result shows that The Policy to Implemented Transport Technology in Jakarta is the most readily accepted by respondents with the percentage is 69% VERY AGREE. It means the Jakarta’s citizen support on creating sustainable transport policy by implementation of transport technology in Jakarta.

5.4. Comparison Summary of Sustainable Transport Development in Freiburg and Jakarta

To compare both cities, the historical background would be an important understanding to fit them in sustainable transport development. Freiburg’s success has depended to some extent on special circumstances. For instance, Freiburg had started to establish a “global transport concept” since 1969. Which stated that the transport infrastructure should be friendly to the people as well as to the environment. In 1960, the streetcar (tram) network instead was removed without providing appropriate buses or other public modes to service the passengers. The author argues that Jakarta was very late to start the strategy of sustainable transport by establishment the first BRT system in 2004. The growth of private vehicle cannot be accommodated by providing BRT system only. But also other transport policies should be integrated to create sustainability.

In the comparison of the sustainable transport development in Freiburg and Jakarta, the author used the findings previous study about Seven Lessons for Implementing Sustainable Transport Policies (Buchler & Pucher, 2011). Those Freiburg’s lessons are used to measure how far Jakarta have implemented sustainable new transport policy (see Table 5.2). The first lesson from Freiburg is implement controversial policies stages. Freiburg implemented most of its policies in stages, often choosing projects everybody agreed upon first. Restriction of private car use policy is good example of controversial policy in stages from Freiburg. For Jakarta, the transport policies depend on the governor leadership period. Before the first establishment of BRT system in 2004, there are no any controversial policies in stages to create sustainable public transit. Because every governor leadership period had own ambitious to achieve own goal without compromising sustainable transport for the future.

The second lesson from Freiburg is over the last 40 years, Freiburg phased and adjust edits policies and goals gradually overtime, because the characteristic of its transport planning is flexible and adaptable over time to changing conditions. In the Jakarta case, we cannot blame to the government that they cannot produce flexible and adaptable transport policy but also the characteristics of the citizen should be an important consideration. Several characteristics of Jakarta’s citizen are difficult to adapt new transport policy and there is a chance to chance to trick in almost every new transport policy. For instance, the phenomenon of jockey in the implementation of 3 in 1 policy. The third lesson is about quality and level of transport services. In Freiburg has multi-modal and also include both incentives
and disincentives. In Jakarta, the quality and level of services is still partial-modal. But since the new leadership of governor in 2012, it was proposed to be a multi-modal services which means that passengers can use not only the BRT system but also can integrate with LRT or MRT services. Incentives and disincentives depends on the political attraction, because politic sector has huge influences in policy determination.

The fourth lesson is transport policy integration. In Freiburg, policies promoting public transport, cycling, and walking rely on a settlement structure that keeps trip distances short and residences and workplaces within reach of public transport. Hence, in Freiburg is fully integrate transport and land-use planning. Jakarta already had complex land-use planning. This is one of the difficulty to create integrated transport. The lack of professionalism from the government in providing better public transport is also becoming important key to creating integrated transport. The fifth lesson is about citizen engagement. In Freiburg, citizen involve to develop transport policy. Citizen is the integral part of transport policy implementation. In Jakarta, just only intellectual community which have awareness about transportation involve to develop transport policy. They provide their idea by formatting community, via internet, forum, etc.

The sixth lesson is about support from national government. Freiburg has support from higher levels of government to make local policies work. Starting in the 1970s, the German federal government reduced funding for highways and provided more flexible funds for improvements in local transport infrastructure—including public transport, walking and cycling. In Jakarta, political background take an important role to address local policies work. Political ambition has big attraction to determine the strategy of the government. To address local policy is depending on who is the political background to make it goal. And the seventh lesson is about the interval of transport policy. Freiburg has long term sustainable transport policies, with policies over time and reducing for lasting impact. Nowadays, Jakarta has a new governor leadership which will try to make sustainable transport policy. The evidences of development of BRT, MRT, Monorail, implementation of ERP are one of the effort to figure out transport problem in Jakarta. Because, as metropolis city, Jakarta is facing complex challenges in many sectors.
<table>
<thead>
<tr>
<th>No.</th>
<th>Transport Policy Comparison</th>
<th>Freiburg</th>
<th>Jakarta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Policies in stages</td>
<td>Implement controversial policies in stages</td>
<td>Depends on governor leadership period</td>
</tr>
<tr>
<td>2.</td>
<td>Characteristic of transport planning</td>
<td>Flexible and adaptable over time to changing conditions</td>
<td>Difficult to adapt and there is a chance to be tricked</td>
</tr>
<tr>
<td>3.</td>
<td>Quality and level of transport services</td>
<td>Multi-modal and include both incentives and disincentives</td>
<td>Partial-modal and include incentives and disincentives depend on political attraction</td>
</tr>
<tr>
<td>4.</td>
<td>Transport policy integration</td>
<td>Fully integrate transport and land-use planning</td>
<td>Unintegrated due to complex land-use planning</td>
</tr>
<tr>
<td>5.</td>
<td>Citizen engagement</td>
<td>Citizen involvement must be an integral part of policy development and implementation</td>
<td>Citizen involvement doesn’t massive, just only intellectual community</td>
</tr>
<tr>
<td>6.</td>
<td>National government support</td>
<td>Support from higher levels of government is crucial to making local policies work</td>
<td>Political background take an important role to address local policies work</td>
</tr>
<tr>
<td>7.</td>
<td>Interval of transport policy</td>
<td>Long term sustainable transport policies, with policies sustained over time and reducing for lasting impact</td>
<td>After 2004, Jakarta has been on the right path to create sustainable transport policies</td>
</tr>
</tbody>
</table>
5.5. The Difficulties to Implement

The author argues that Jakarta actually already have a good transport policy to create sustainability. Strategy of Macro Transport shown the long term strategy on creating sustainable transport in Jakarta. Jakarta has begun to implement sustainable transport with the project establishing BRT System (TransJakarta), but some other policies are still developing to implement. Technically, Jakarta had improved long term transport policy quite good to break traffic congestion.

The author identified some factor that determine the difficulties to implement sustainable transport policy in Jakarta. The main problem in Jakarta about creating sustainable transport policy is (1) the lack of effective policy implementation, mainly due to strong political attraction to achieve the ambitious policy objectives. Some political parties take part an important position to determine transport policy that giving more advantages to their selves. For instance, the difficulties to implement car use restriction policy in Jakarta. For car industries, they would negotiate how their products (car) will be able to exist for their customers. And political representative party in Jakarta become an important role to negotiate how “car use restriction policy” cannot be implemented. The other factor of the difficulties to implement sustainable transport policy in Jakarta is (2) the complexity of bureaucracy (governmental administrative system). There are too many procedures to process and execute transport policies that make policy involve huge stakeholders and parties. (3) Unbalancing of the economic distribution in Jakarta also determine how sustainable transport policy works. This factor also creates different social level in Jakarta and determine the level of education as well. And the last factor is about (4) awareness about creating and applying sustainable transportation. Awareness about creating and applying sustainable transportation is not only for the Jakarta’s citizen, but also for the Jakarta’s government. Because if people of Jakarta have awareness about creating and applying sustainable transportation, they would save the future generation from the impact of transport field.

Based on the comparison study from Freiburg, the author argues that the most successful factor on creating sustainable transport policy is about awareness. The awareness about creating sustainable transport policy for the first time begun from the Freiburg government since policy reversal in early 1970s. Economic success and widespread political support for the sustainability made change in Freiburg’s transport and land-use policies possible. Since the 1970s, the city has increasingly restricted car use while improving public transport, cycling, and walking. The awareness about creating and applying sustainable transport policy would affect to the other sector which have important role in improving sustainability. For instance, the citizen also take a part to engage on the successful sustainability. And the bureaucracy of Freiburg support on creating sustainability. That’s why in 2007, Freiburg had become Germany’s leader in green industries (City of Freiburg 2009a).
Sustainable public transport development covers wide area to implement. By the new governor leadership since 2012, Jakarta was heading to be “a new Jakarta” which can create sustainable transport. The main focus of Jakarta now is about breaking high traffic congestion that suffer almost all primary roads in Jakarta. Therefore, Jakarta is facing major challenges in the integrating sustainable transport policy. Learning from successful history of Freiburg about sustainable transport development would make Jakarta understand what the really Jakarta needs to develop sustainable transport policy. Regarding from the analysis and comparison studies between Jakarta and Freiburg, the author tries to conclude main problems to creating sustainable transport policy in Jakarta.

The author concluded that there are three keys to improve new transport policy in creating sustainable and integrated public transit. The first key is about implementing transport technology, including development of public transport, implementation of ICT (Information Communicating Technology), applying Electronic Road Pricing (ERP) and promoting e-commerce as a tool to reducing environmental impact and mobility. Second key is adding transport supply proportionally. Which means that not only construct new transport infrastructure, but also increasing service level of public transport performance. Applying Minimum Service Standard (MSS) in public transport is one of the important requirement to raise service level. Third key is reducing transport demand. The high traffic congestion forces Jakarta to reduce (minimize) mobility in order to declining environmental impact and more safe. Public transport is one of a tool to reduce private vehicle mobility.

Indeed, new transport policy has an important role to create sustainability in transport field. First, transport policy takes a role as an instrument to reduce environmental impact, particularly by implementing transport technology properly. Second, transport policy takes a role as an instrument to increase service level. Not only constructing new transport infrastructures. Third role of transport policy is an instrument to create sustainable transport management. Balancing transport supply and demand is important to make traffic stable. Land-use planning, organization management are one of the critical key to reduce mobility by creating sustainable transport management.

Based on the comparison of the successful story in Freiburg about developing sustainable transport policy, these are the results that author identified. The main problem in Jakarta about creating sustainable transport policy is the lack of effective policy implementation, mainly due to strong political attraction to achieve the ambitious policy objectives; complex land-use and inter-modal negotiation process; lack of car and motorcycle use restriction policy; lack of increasing service level in BRT system including lack of the buses service,
punctuality of bus service and integrating multi-modal from BRT; lack of awareness about environmental maintenance, mainly from transport sector; the complex political and policy relationship between provincial government and parliament; lack of integrated transport policy with the nearest outside area from Jakarta; lack of citizen engagement to develop and implement sustainable transport policy; lack of sustainable (everlasting) transport policy for the present and future generation; and significant migrations from other city to Jakarta make Jakarta is getting crowded over time. And from measurement about the hypothesis of scenario of improving new transport to create sustainable public transport with the spreading of questionnaires, the result shows that The Policy to Implemented Transport Technology in Jakarta is the most readily accepted by respondents with the percentage is 69% VERY AGREE.

For the suggestion to the government of Jakarta, the author argues (1) that very important for having awareness about creating and applying sustainable transport, not only for the citizen but also for the high level in the government of Jakarta; (2) creating accessible bureaucracy which make easy to process and execute sustainable transport policy; (3) equitable distribution of economic well-being on all levels of society; (4) eliminate ambitious of some political attraction that will give some advantages for them (corruption).

Based on the above discussion, for the contribution from this study, the author argues that government of Jakarta as a main authority, should be concern to create sustainable transport policy. Reducing high traffic congestion is important, but to make sustainability is also more important. Because it will contribute not only for the present but also for the future generation.

- Future research
  The author suggests for the future research that the important discussion is about sustainable and integrating all public transport policy, particularly integrated system with railway in Jakarta. Hence, not only TransJakarta as a BRT system, but also important to develop sustainable and integrated LRT (light rail transit) to figure out traffic problem in Jakarta. Therefore, the author stresses to the next research is about creating sustainable and integrated railway transport policy.
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