DOCTORAL DISSERTATION

博 士 論 文

A STUDY ON EVALUATING URBAN BUS SERVICE PERFORMANCE IN DEVELOPING COUNTRIES: CASE STUDIES OF MEDIUM-SIZED CITIES IN INDONESIA

発展途上国における都市バスサービスパフォーマンスの評価に関する研究:インドネシアの中規模都市のケーススタディを通して

Yokohama National University
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Doctor of Engineering

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ABSTRACT

As many cities of developing countries become more prosperous, the demand for mobility among the urban community is rapidly growing. This is no where more the case than in Jakarta and other big cities, but also in medium-sized cities –each day city streets become frozen with congestion. In order to deal with the increasing transport problems faced in Indonesian cities, the Ministry of Transport of Indonesian and few local governments is pleased to introduce the new Trans bus system. MoT funds several bus vehicles and supports some of the infrastructures. From the target of twenty pilot cities by 2014, to date, ten cities have signed memorandum of understanding with MoT and launched such systems include TransJogja of Jogjakarta and TransMusi of Palembang, in addition to TransJakarta as a pilot project.

The documentary evidence of the presence of a new urban bus services was greeted with enthusiasm from the riding public. However, service quality and customer satisfaction is declining which frequent customers receive service and quality that falls well below their expectations. This research is conducted to investigate and analyze service quality performances of new urban bus from different points of view such as service providers, transport authority and customer. The main objectives of this research are to examine the organizational capability of service providers to deliver urban bus services, to investigate what are the roles and responsibilities of transport authority to ensure that fulfilled the obligation to provide basic services, and to measure the consumer opinion on the quality of service. Several city and provincial transport authorities, and local researchers are interviewed in order to understand existing transport usage, institutional and other applied aspects concerning the regulations.

This research draws lesson from case example of implemented new BRT or like of medium-sized cities of Indonesia that has direct relevance to cities in developing countries that are currently adopting in new bus rapid transit (BRT) project. These cities are selected as case studies corresponding to the criteria of rapidly growing and motorizing cities and rapidly expanding urban bus services as well. On the other hand, decentralization of urban management from national government to provincials and municipalities is increasingly placing responsibility for transportation on the shoulders of local leaders. However, local governments do not necessarily yet have capacity to manage these large scale systems. This study found that where there is political will to introduce new technology such as BRT, often the financial resources to operate and maintain large scale systems is limited and BRT may not even be serving the needs of the low income group.

Hence, it is essential to evaluate urban bus service performance based on the point of views of the service provider, transport authority, and customer as well that should address critical issues for improvement of service quality performance towards the achievement of sustainable development. In doing so, this report describes how new urban bus improves mobility in cities by complementing other formal and informal transportation modes, but the government efforts, both central and local governments, to supply public transportation through MoT's land transport improvement projects are insufficient at best.

In order to deal with the decreased service quality, the financial and organizational reforms on public transport industry are needed to reform as well as the existing regulatory policies and operational practices leading to an improved and more efficient urban bus operation, without neglecting business and commercial elements. The target groups for the actions are bus companies, local government transport office of Jogjakarta Province, city level of both Palembang and Bandar Lampung as the planner of the systems. These would be done through series of comprehensive researches/studies covering: assessment on current system, operation, financing, regulations and enforcement, development of a modern, commercial and customer oriented strategy followed by training and workshops to local government staffs and bus operators on effective route and service planning, operational and maintenance system, followed by a demo project as a showcase for better operational system.

The originality of the methodological approach adopted for this research is given by the integrated assessment of three main actors in managing urban transport systems and covering the historic cores of the three cities of Jogjakarta, Palembang and Lampung which have a variation in terms of their size, economy, and regulatory environment.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Completing sustainable urban public transport is a main challenge faced by countries around the world, in particular developing countries which have to address with transport-related environmental problems associated with the increasing trend in car ownership and use. On the other hand, as many cities become more prosperous, the demand for mobility among the urban community is rapidly growing. Aiming to tackle the increased motorization in Indonesian cities, particularly motorcycles, the Ministry of Transportation (MoT) of Indonesia enacted a decree No. 51 of 2007 promoting pilot cities for land transport improvement. The decree mandates the pilot city candidates to reflect their commitments by providing documents declaring their preparedness in terms of institutional capacity, funding capacity, human resource availability and conducting urban transportation master plan studies. MoT funds several bus vehicles and supports some of the infrastructures. From the target of 20 pilot cities by 2014, to date, 10 cities have signed memorandum of understanding with MoT and launched such systems include TransJogja of Jogjakarta and TransMusi of Palembang, in addition to TransJakarta as a pilot project.

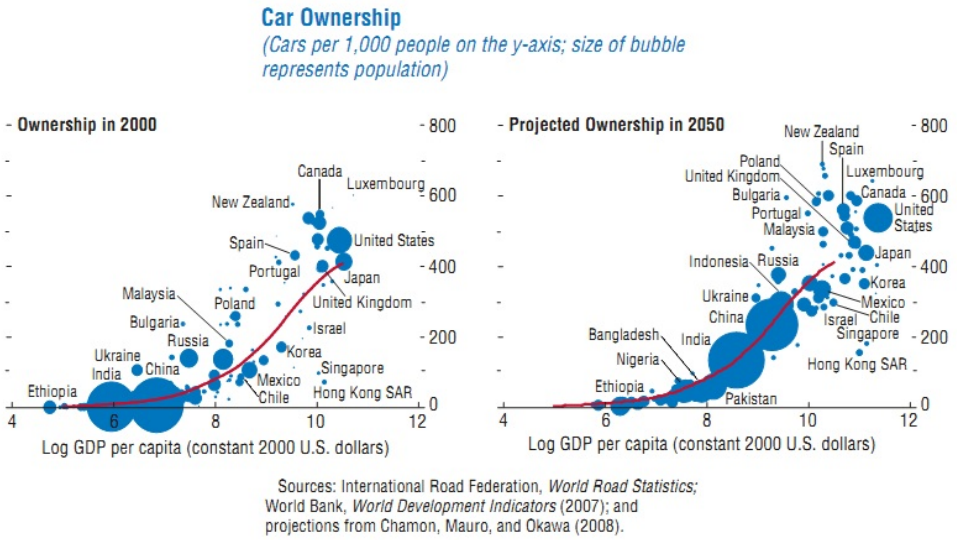


Figure 1-1 Trend of motorization

The documentary evidence of the presence of a new urban bus services was greeted with enthusiasm from the riding public. However, service quality and customer satisfaction is declining which frequent customers receive service and quality that falls well below their expectations. New urban bus is minimal and erratic; passengers make complaints about buses that arrive too late and buses continue to lose market share.

It is inevitable, TransJogja, TransMusi and TransLampung started with very little institutional sustainability in 2008, 2010, and 2011, respectively, even to date no new formal authority has been established for TransJogja, TransMusi, and TransLampung; daily operation of urban bus service in case study cities are mostly controlled by operator without adequate supervision of provincial and city governments. Provincial or city government and Trans bus management practices are not consistent with evolving public management policy in Indonesia. To accord with this evolving policy, the head of the transportation agency (Dishub), as the official responsible to the governor or mayor for public transport, should regulate the Trans bus, but this role is not yet defined. His agency still makes decisions that limit the performance of the Trans bus, especially regarding investment. Hence, Trans bus does not have control over the resources needed to be performance oriented. Other agencies make many decisions that limit performance. Thus it is not clear who is responsible for Trans bus service performance.

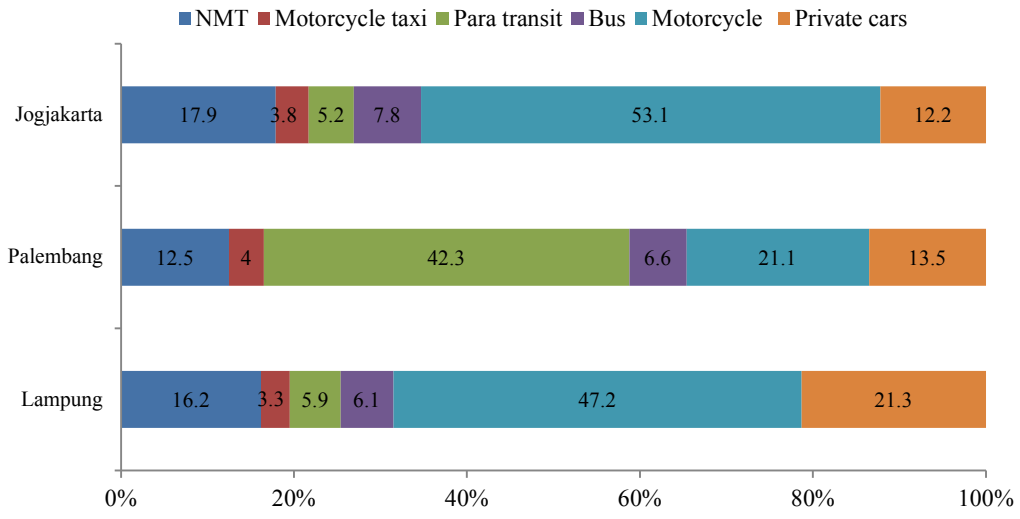


Figure 1-2 Modal shares of transport modes in selected cities

There is no provincial or city reporting on the implementation of the project. Each agency reports their own element of the work but these reports are not

consolidated into a report on the performance of the Trans bus and efforts to improve it. The regional development planning agency (Bappeda) is responsible for coordinating planning. The planning and budget framework inadequately identifies the work that supporting agencies perform for the Trans bus. The provincial secretariat is responsible for coordinating implementation, but there is no requirement for agencies to prepare detailed work plans that can be used as the basis for such coordination.

The lessons learnt for the case studies of new urban bus service performance in these cities revealed that the planning of Trans buses use some of scientific models and findings produced by the project, but prefers to "learn by doing". Learning by doing is the most sustainable way, but in the cases of TransJogja, TransMusi, and TransLampung, these have been slow and inefficient, due to a reluctance or inability to identify past mistakes and avoid repeating them. Moreover, the need for institutional coordination across space and function is increasingly being recognized as critical to developing an integrated and comprehensive urban transport system (World Bank, 2013).

The improvement of the transport system works like other institutional assets in increasing the current and future development potential. The characteristics of transport infrastructure, the regulatory needs for the industry and external effects of transport require a strong role of government in providing a transport system that promotes growth and poverty reduction. One dimension of bad institution is the failure to provide basic public goods that induce development (Rodrik, 2012). Introducing new technologies such BRT or like looks good politically, but more efforts are needed to make urban bus systems become more effective solution to meet transportation demand.

1.2 WHY MEDIUM-SIZED CITIES?

Evidence of the role played by medium-sized cities in national development is scanty. However, some authors (Rondinelli, 1985; Mathur,1982; Fawcett et al., 1980) suggest that the potential benefits of secondary cities include: countering metropolitan growth; promotion of regional development; absorbing population and thus relieving pressures on primate cities; stimulation of rural economies by providing linkages between rural and urban areas; and promoting national spatial integration via a more dispersed population.

The current roles of medium-sized cities and their significance in relation to the national center vary with the size of the nation and its level of development. The Philippines, Thailand, Republic of Korea and Indonesia have in common the problem of primacy and the need to develop stronger regional centers. China and India, because of their size, have well established large regional centers, but serious problems of national

and regional integration. Malaysia and other Asian countries, with less evident problems of primacy, are nevertheless concerned with fostering urban growth outside their capital regions.

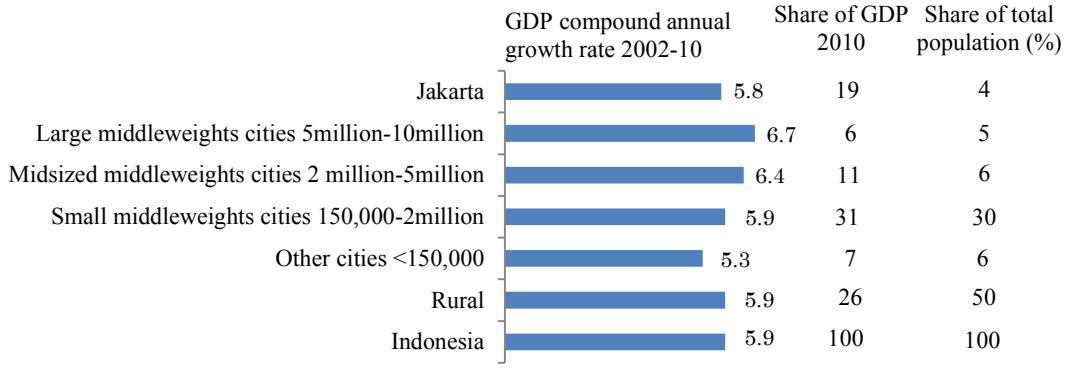


Figure 1-3 Medium-sized cities in Indonesia
(Source: McKinsey Global Institute "The archipelago economy: Unleashing Indonesia's Potential" dated September 2012)

It is inevitable, the medium-sized cities have a vital role to play in national development. These cities have unique transport problems, but traffic management alone is limited in solving the problems of urban transportation. Introduction of new urban bus systems is essential in solving these problems, hence performance measurement is needed in order to improve performance and the quality of service provided.

1.3 STATEMENT OF PROBLEM

Generally, there are three major actors are identified in mechanism of urban bus transport system such as service provider, transport authority and customer. Local government controls service provider through regulatory framework. In return, the service provider offers urban bus services for meeting the needs of the users. And the users participate both by using urban bus services and controlling the government through the political process. In order to define service quality levels in urban public transport, QUATTRO (2003) propose to use a simplified quality loop based on the standard norm loop for quality of service.

Each actor has its own responsibility, expectations, satisfactions, different points of view and degree of influence in terms of the way urban bus services are delivered. Van de Velde (1999) has highlighted three levels of functions that need to be performed in the delivery of urban transport service:

- ✧ The strategic level, which concerns the formulation of general aims and determination of the broad terms and means that can be used to attain these -in short, "what we want to achieve."
- ✧ The intermediate/tactical level, which involves making decisions on the means for achieving goals and how to use these means most efficiently -in short, "what product can help to achieve the aims."
- ✧ The operational level, which concerns ensuring that orders are carried out and that it happens in an efficient manner -in short, "how do we produce that product."

However, the functions and the level of involvement of the three tiers of government such as national, provincial and city in all case study cities are sometimes not clear.

In general, this research addresses the following issues:

- ✧ What factors do we need to consider in evaluating urban public transport system, especially new urban bus system performance?
- ✧ How we can investigate such factor and what kinds of questionnaire and survey approaches are appropriate in this context?
- ✧ What kind of organization is performing its functions and meeting its goals and objectives in order to improve the delivery and attractiveness of urban public transport modes in cities?

In specific, this research addresses the following issues:

- ✧ How the level of service delivered is assessed?
- ✧ How can customer satisfaction index (CSI) and key performance indicators be developed to investigate service quality level of new urban bus services?

1.4 RESEARCH GOAL AND OBJECTIVES

The goal of this study is to investigate key indicators that may affect service performance of urban public transport services from different points of view such as service provider, transport authority and customer by selecting Bandar Lampung, Palembang and Jogjakarta as the case study cities.

To achieve this goal, following objectives have been set:

1. Measuring service quality and evaluate the ability of service providers to deliver urban bus services in case study cities (***chapter 4***)
2. To investigate distribution of transport subsidies and affordability (***chapter 5***)
3. To assess public transportation system from viewpoint of setting up new agency referring to international experience (***chapter 6***)
4. Measuring customer satisfaction index, a measure of operators performance and

transport authorities in delivering services (***chapter 7***)

5. Measuring customers' expectations and their perceptions of the service quality (***chapter 8***)

1.5 SCOPE AND LIMITATIONS

The findings of this research would help in evaluating urban bus service performance and demonstrate how the baseline service performance levels can be improved by key stakeholders. The study main applications include:

- ✓ It shows the importance of being maintaining quality of service in order to maintain customer satisfaction and loyalty.
- ✓ This study total household spending on transport in case study cities is two times higher than other cities across countries.
- ✓ This study suggests the need for institutional coordination across space and function is increasingly being recognized as critical to developing an integrated and comprehensive urban transport system.
- ✓ This study provides the evidence that the roles responsibilities of operators and transport authorities are appear to have insufficiently in delivering an appropriate urban bus services.

Beside several applications, this study has following limitations:

- ↘ As sample size is limited in questionnaire surveys and interviews, and target groups are specific segments; therefore the findings may not reflect the perceptions of whole community or all groups.
- ↘ It is inevitable, several agencies involved in urban transport policy and management, however their role in this research are not considered.
- ↘ It is difficult to generalize the underlying factors and measures for solving urban transport problems in all developing countries. Hence, lessons learned from specific cities and communities are not transferable to another. To succeed in implementing, probably has to be adapted to local circumstances in a first step.

1.6 STRUCTURE OF THESIS

Chapter 2: This chapter describes the research background and review of empirical studies. It includes public transportation service quality measurement performance, the variety of performance measures, measuring urban transport performance from different points of view. Empirical studies on evaluating urban transport service quality in developed and developing countries have also been

presented relating to application of measuring customer satisfaction index.

Chapter 3: This chapter describes the various steps of research methodology. These steps include selection of case study cities and statistical measures for study, data collection methods, and background of data analysis methodologies. It also describes the characteristics of all case study cities.

Chapter 4: This chapter investigates level of service quality and evaluates the ability of service providers to deliver urban bus services in case study cities. The range of transport authority on general functions has been assessed.

Chapter 5: This chapter describes affordability and subsidies in urban public transport: an international comparison of local transport subsidies. This part explores the relationship between institutional arrangements for public transport and operating subsidies for public transport.

Chapter 6: This chapter deals with the increasingly important issues of roles and responsibilities of transport authorities, with case study cities. The objective here is to assess what lead agency models are worthy of adopting and then modify them to the most feasible adjustments of existing institution to demonstrate the effectiveness of this institutional model.

Chapter 7: This chapter presents the results of evaluation of commuter's satisfaction with new urban bus services based on user perceptions and expectations. This part provides a comprehensive tool for measuring the overall transit service quality, named Heterogeneous Customer Satisfaction Index (HCSI), by considering different service aspects.

Chapter 8: Considering the results of previous four chapters, integrated measuring customers' expectations and their perceptions of the service quality has been developed for this purpose in this chapter.

Chapter 9: This chapter summarizes the main findings and policy implications of this research. At the end, recommendations are made for future research.

Hence, the interrelated parts of each chapter are described in **Figure 1-4**.

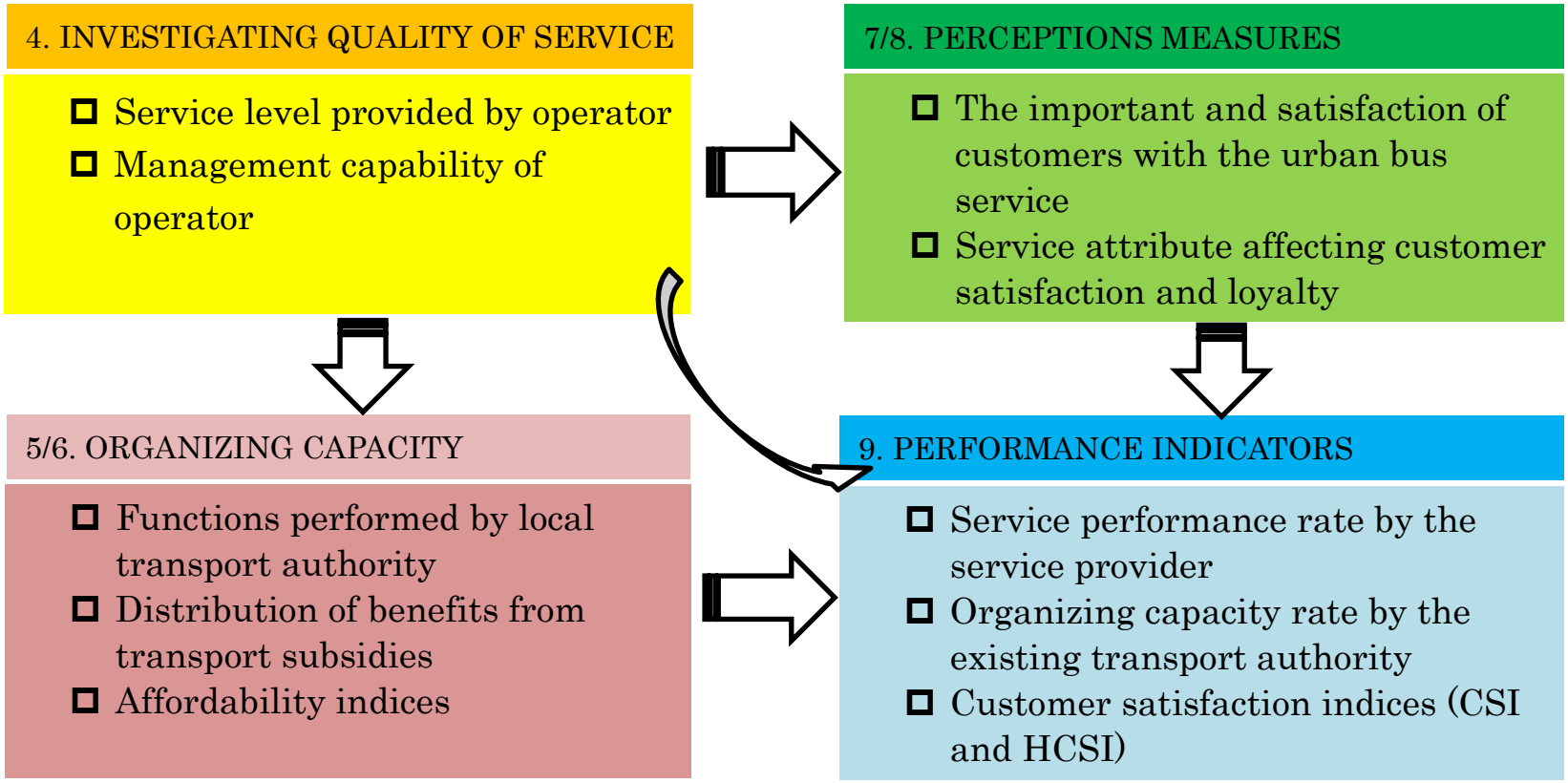


Figure 1-4 Research framework

CHAPTER 2

A REVIEW OF THEORIES AND EMPIRICAL STUDIES ON PUBLIC TRANSPORTATION SERVICE QUALITY

This chapter presents the material related to theories and empirical studies on evaluating public transport service quality. Extensive literature was reviewed both from developed and developing countries regarding performance evaluation mechanism of public transport service quality and academic researches focusing on evaluation of factors influencing service quality. Performance measures are specifically used to measure and compare the performance indicators to the prevailing international standards. The experiences in regulation and formalization of advanced empirical studies on evaluating urban transport service quality from both developed and developing countries are also incorporated in this chapter.

2.1 PUBLIC TRANSPORTATION SERVICE QUALITY MEASUREMENT PERFORMANCE

Performance measurement can be defined as the assessment of an organization's output as a product of the management of its internal resources (money, people, vehicles, facilities) and the environment in which it operates (Transportation Research Board, 1994, 2004b). Performance measurement is very useful for different aims: assisting in evaluating the urban transport system's overall performance, assessing management performance expectations of the transport system in relation to community objectives, assessing management performance and diagnosing problems such as disproportionate cost in relation to service, allocating resources among competing urban transport properties, providing a management control system for monitoring and improving urban transport services, facilitating the accountability sought by government funding agencies and demanded by legislators, regional and urban transport authority boards, and the general public.

Performance in general terms refers to any evaluation or comparison measure. A performance measure can be considered as a quantitative or qualitative characterization of performance. Each of these measures has certain indicators that are used to signify urban transport performance for each particular measure. A performance indicator is more specifically a performance measure used to document progress toward a performance goal, and to monitor performance. A review of the literature on urban transport performance reveals that not all agencies use the same terms for performance

measures (e.g. Fielding, 1987). As an example, the TCRP Report 88 (Transportation Research Board, 2003a) proposes a classification which considers indicators of cost-efficiency, defined as the measure of service output compared to unit of input (cost), cost-effectiveness, defined as the measure of outcome compared to unit of input in terms of cost, and service effectiveness, which is the measure of outcome compared to unit of input in terms of service. Referring to Litman (2009) there are three general types of performance indicators: measures of service quality, which reflect the quality of service experienced by users; indicators of outcomes, which reflect outcomes or outputs; indicators of cost efficiency, which reflect the ratio of inputs (costs) to outputs (desired benefits).

Meyer (2000) classifies the performance indicators into three more comprehensive categories. A first category is represented by general performance indicators such as service area population, passenger trips, vehicle kilometers and hours, and so on. The second category is represented by the effectiveness measures including the following subcategories: service supply (passenger trips per capita, passenger trips per hour); quality of service (average speed, average headway, number of incidents); availability (weekday span of service, route kilometers per square kilometer). The third category includes efficiency measures divided into: cost efficiency (operating expenses per passenger trip, operating expenses per revenue hour); operating ratios (local revenue per operating expenses); vehicle utilization (vehicle kilometers per peak vehicle, vehicle hours per peak vehicle); labor productivity (passenger trips per employee); energy use (vehicle kilometers per kW-h); fare.

Vuchic (2007) proposes an enough comprehensive classification of performance indicators: transportation quantity or volume (number of vehicles or fleet size, fleet capacity, number of lines and network length, annual number of passengers); system and network performance (intensity of network service, average speed on a urban transport system); transportation work and productivity (annual vehicle-kilometers, annual space-kilometers, annual passenger-kilometers); urban transport system efficiency indicators (vehicle-kilometers/vehicle/year, passengers/vehicle-kilometers, daily passengers/employee, vehicle-kilometers/kilowatt-hour); consumption rates and utilization indicators (operating cost/passenger, operating cost/vehicle-kilometer, scheduled vehicles/fleet size).

A similar classification was proposed by Carter and Lomax (1992) structured in six categories of indicators: cost efficiency (cost per kilometer, cost per hour); cost effectiveness (cost per passenger trip, ridership per expense); service utilization/effectiveness (passenger trips per kilometers, passenger trips per hour);

vehicle utilization/efficiency (kilometers per vehicle); service quality (average speed, vehicle kilometers between accidents); labor productivity (passenger trips per employee, vehicle kilometers per employee).

Then, what is important and vital in the performance and delivery of an urban transport service depends significantly upon perspective (Transportation Research Board, 2003a). As an example, the traditional cost efficiency and effectiveness indicators can be considered as performance measures from the urban transport agency perspective, while they are not linked to customer-oriented and community issues, which are fundamental perspectives in the evaluation of a service (Transportation Research Board, 2003a). Many researchers consider the customer's point of view the most relevant for evaluating urban transport performance; as an example, Berry et al. (1990) pointed out that "customers are the sole judge of service quality". Passengers evaluate services in many ways that may not be systematically associated with the amount of use of the service, because the measures of efficiency and effectiveness, as aggregate indicators of total output, implicitly assume homogeneity of service quality (Hensher, 2007). So, from the passenger's point of view, urban transport performance must be evaluated by considering indicators of service quality (Transportation Research Board, 2003b).

Urban transport service quality can be measured by a range of simple disaggregate performance measures which can be used for measuring the ability of a urban transport agency to offer services that meet customer expectations (Transportation Research Board, 1999b). These performance measures are quantitative measures expressed as a numerical value, which provides no information by itself about how good or bad a specific result is, and for this reason it must be compared with a fixed standard or past performance. These measures can be considered as objective measures. Service quality can be also evaluated on the basis of urban transport user judgements. These judgements, which can be considered a subjective measure of service quality, generally derive from the well-known Customer Satisfaction Surveys (CSS), which help urban transport operators to identify which service quality factors are considered the most important by their customers. Customer judgements can be expressed in terms of expectations, which represent what customers expect of the service, and perceptions, which represent what customers receive from the service (Parasuraman et al., 1985).

2.1.1 Why measure performance?

Performance measures are used by public transport agencies for three main reasons (TRB, 2003):

- ✧ Because they are required to do so;
- ✧ Because it is useful to the agency to do so; and
- ✧ Because others outside the agency need to know what is going on.

Reporting and regulatory requirements will dictate a certain number of performance measures that will have to be reported. In United State, the measures that agencies are required to collect and report to the National Transit Database (FTA, 2000). Agencies collect other measures to help identify how well service is being provided to their customers, the areas where improvement may be needed, and the effects of actions previously taken to improve performance. In these cases, agencies use performance measures to help provide service as efficiently as possible, monitor whether agency and community goals are being met, an -over time- improve service so that it attracts new riders. Changes in policy, procedures, and planning can result from an understanding and appraisal of certain measures.

Performance measurement data provide public transport agency management with objective assessments of current circumstances, past trends, existing concerns, and unmet needs. Key management uses of a performance measurement system include

- Service monitoring,
- Evaluation of economic performance,
- Management functions,
- Internal communications,
- Development of service design standards,
- Communication of achievements and challenges, and
- Noting of community benefits.

Litman (2015) suggested a more comprehensive analysis includes more impacts and so is more accurate. This is not to suggest that every public transport project is cost effective or that public transport is always the best solution to every transport problems. However, public transport improvements tend to provide significantly more value to society than conventional models indicate. There are four general categories of public transport improvements to consider:

- Increased service (more public transport vehicle-miles)
- Improved service (more comfortable, convenient, reliable, etc.).
- Public transport use incentives (lower fares, commuter financial incentives, marketing, etc.). public transport

- Public transport oriented development (land use patterns designed to support transit, including more compact, walkable, mixed development around public transport stations and corridors).

Also, public transport performance evaluation can reflect various perspectives. Many commonly used public transport performance indicators such as load factor and cost-per-vehicle-kilometer, measure operating efficiency. Other indicators such as rider comfort, travel speed and reliability, affordability, integration and satisfaction, reflect the user experience. User oriented indicators are important for developing public transport system that respond to user demands and so are able to attract even choice riders (GIZ, 2011).

2.1.2 The variety of performance measures

To get a sense of what service quality is, it is useful to understand what it is not. **Table 2-1** illustrates one way that urban transport performance measures can be categorized and shows how service quality fits into the spectrum of urban transport performance measures. At the broadest level, there are a variety of performance measures that have been developed to describe different aspects of urban transport service. These measures can be organized into particular categories, such as service availability or maintenance and construction. TCRP Report 88 (2003) identifies the following categories:

- ✧ *Availability*: measures assessing how easily potential passengers can use urban transport for various kinds of trips;
- ✧ *Service Monitoring*: measures that assess passengers' day-to-day experiences using urban transport;
- ✧ *Community*: measures of public transport's role in meeting broad community objectives, and urban transport's impact on the community it serves;
- ✧ *Travel Time*: how long it takes to make a trip by urban transport, by itself, in comparison with another mode, or in comparison with an ideal value;
- ✧ *Safety and Security*: the likelihood that one will be involved in an accident (*safety*) or become a victim of crime (*security*) while using public transport;
- ✧ *Maintenance and Construction*: the effectiveness of the agency's maintenance program and the impacts of urban transport construction on passengers;
- ✧ *Economic*: measures of urban transport performance from a business perspective; and
- ✧ *Capacity*: the ability of urban transport facilities to move people and urban transport vehicles.

Table 2-1 Urban transport performance measure categories and examples

(Source: TCRP Report 88, 2003)

			PERFORMANCE MEASURE EXAMPLES	
COMMUNITY	PASSENGER ("QUALITY OF SERVICE")	TRAVEL TIME	• Urban transport-Auto travel time	• Transfer time
		AVAILABILITY	• Service coverage • Service denials	• Frequency • Hours of service
		SERVICE DELIVERY	• Reliability • Comfort	• Passenger environment • Customer satisfaction
		SAFETY & SECURITY	• Vehicle accident rate • Passenger accident rate	• Crime rate • % vehicles with safety devices
	AGENCY	MAINTENANCE & CONSTRUCTION	• Road calls • Fleet cleaning	• Space ratio • Construction impact
		ECONOMIC	• Ridership • Fleet maintenance performance	• Cost efficiency • Cost effectiveness
		TRANSPORT IMPACT	• Community economic impact • Employment impact	• Environmental impact • Mobility
	VEHICLE/DRIVER	CAPACITY	• Vehicle capacity • Volume to capacity ratio	• Roadway capacity
		TRAVEL TIME	• Delay	• System speed

Some of these categories more directly affect passengers' experience while using urban transport than others. Each category can be assigned to one or more points of view, reflecting the primary viewpoint(s) of the measures in that category.

2.2 PRIMARY VIEWPOINT OF MEASURING URBAN TRANSPORT PERFORMANCE

2.2.1 Service provider

For public transport agencies, higher levels of customer satisfaction are associated with a better public image, customer loyalty and, consequently, customer retention and increased ridership, all else being equal. Public transport customers experiencing high levels of satisfaction will be more likely to encourage their friends and relatives to take public transport. Although empirical evidence is limited, increases in customer satisfaction are generally believed to (TCRP Report, 1999 and Fornell, 1992)

- Shift the demand curve upward and/or make the slope of the curve steeper (i.e., lower price elasticity, higher margins),
- Reduce marketing costs (customer acquisition requires more effort),
- Reduce customer turnover,
- Lower employee turnover (satisfied customers affect the satisfaction of front-line personnel),
- Enhance reputation and public image (positive customer word-of mouth), and
- Reduce failure costs (handling customer complaints).

One source that does provide evidence of these linkages is TCRP Web Document 12 (2000), which reports results of studies that associate changes in service and other components of customer satisfaction with ridership levels. These studies are not always conclusive, and it is often difficult to isolate the effects of service and service quality changes on ridership, due to the confounding effects of demographics, environmental variables, and economic conditions. However, many studies have indicated that service improvements result in increased demand. If the improvements are accompanied by favorable demographics and economic growth, ridership growth can be significant.

2.2.2 Transport authority

The organization or transport authority will have a decidedly different perspective. Ensuring that the service provider is operating efficiently (i.e., doing things right) and effectively (i.e., doing the right thing) will be central considerations. Individuals within the organization will normally be committed to the success of the

mission of urban transport, which is to provide service and be an asset to the community. The organization will be most concerned with organizational performance. This includes measures of how well the service is working. Results of performance measures give the organization some guidance as to what course of action to take and what kind of results should occur.

The organization will also be concerned that customer and community concerns are addressed. Many urban transport operators have assumed that if they did their job well and the performance measures were good, there would be no other customer or community concerns. Others recognize that customer and community concerns are significant issues, but are uncertain as to how to apply performance measures as a means to address those concerns.

2.2.3 Customer

The Transit Capacity and Quality of Service Manual (1999) identify two areas of greatest concern to passengers: service availability, and the comfort and convenience of service when it is available. Public transport service is an option for a trip only when service is available at or near the locations and at times when a customer wants to travel, can get to and from the public transport stops, knows how to use the service and sufficient capacity is available at the desired time. If any of these factors is not satisfied, public transport will not be an option for that trip-either a different mode will be used, the trip will be taken at a less convenient time, or the trip will not be made at all. These factors can be summarized as

- ✓ *Spatial availability:* Where is service provided, and can one get to it?
- ✓ *Temporal availability:* When is service provided?
- ✓ *Information availability:* Does the customer know how to use the service?
- ✓ *Capacity availability:* Is passenger space available for the desired trip?

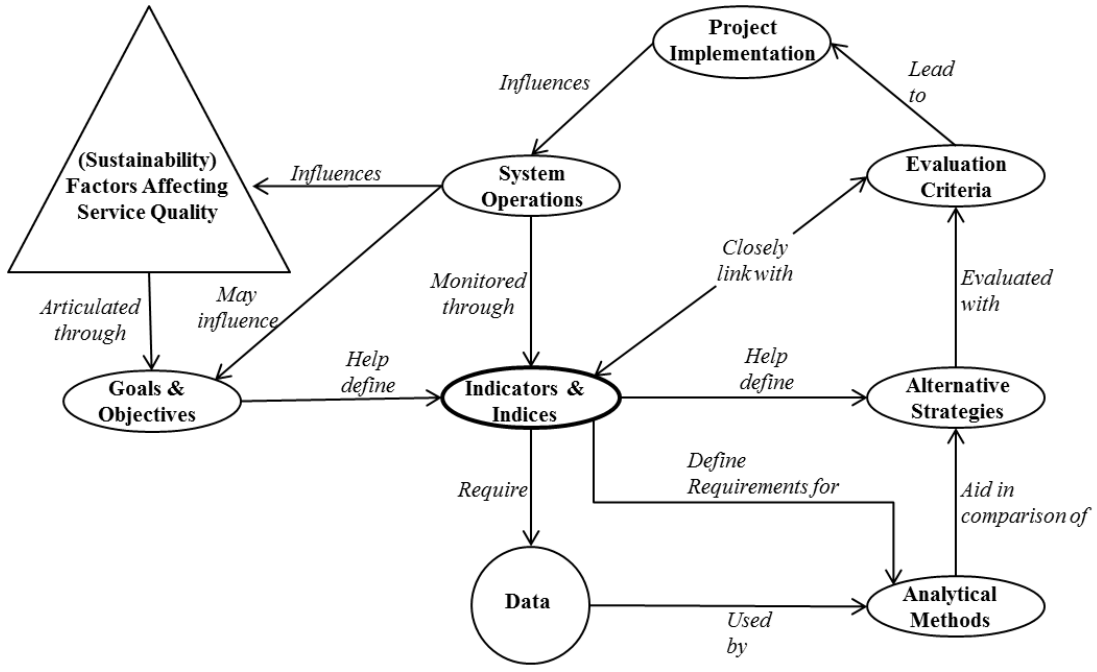
If service is available for a given trip, a customer may choose public transport if its comfort and convenience are competitive with other available modes. Things fully or partially under the control of the public transport agency that affects this decision are:

- *Travel time:* how long does it take to make a trip by public transport, particularly in comparison to other modes? Results can be reported by themselves, aggregated by the number of people (e.g., person minutes of delay), or converted to a monetary value.
- *Safety and security:* what are passengers' perceptions, as well as the realities, of the risks of being injured (*safety*) or becoming the victim of a crime (*security*) while using urban transport?

- *Maintenance:* certain aspects of an operator's maintenance program affect passengers' perceptions of service quality. A vehicle's breaking down while in service impacts passengers' travel time for that trip and their overall sense of system reliability. Having insufficient spare buses available may mean that some trips are not made; dirty buses may suggest to passengers a lack of attention to less-visible aspects of urban transport service, while window etchings may suggest a lack of security.

2.2.4 Measuring urban transport performance

It must be admitted, evaluating on urban transport performance has long used indicator, such as level of service (LOS) to assess urban transport system performance. As depicted in **Figure 2-1**, in an idealized urban transport evaluating process indicators, which require data, reflect overall goals and objectives, help define alternative strategies and relevant evaluation methods, and ultimately aid in monitoring system performance. This leads to what Meyer and Miller (2001) call performance-based transport planning. The appropriate (that is, valid and reliable) indicators for this kind of urban transport evaluating process will vary depending on the scale of analysis, as in the case of an individual facility, a corridor or a regional network (Ewing, 1995), and on the ultimate goals.



Source: Adapted from Meyer and Miller (2001)

Figure 2-1 The role of indicators in the public transport evaluating process

In performance-based urban transport evaluation, indicators are closely tied to project evaluation criteria. If such indicators aim to reflect what is considered important, these same important aspects should be reflected in evaluation (Dimitriou and Gakenheimer, 2011).

Effort to measure urban transport performance through indicators is numerous. At the global level, as part of its 2001 global urban mobility assessment, the WBSCD proposed 12 indicators, grouped into categories of measures to be increased and to be reduced, providing a qualitative and fairly sobering assessment of current trends. Due to the relative vagueness of many of these indicators, in their follow-up study, the WBSCD (2004) proposed a modified indicator set.

While the European Union (EU)-funded SPARTACUS project looked at sustainable transport in three cities in Europe, such as Helsinki, Naples and Bilbao. In a forward-looking analysis, assessing the effect of policies on urban transport sustainability, this project combined an integrated land use transport model (MEPLAN) with tools to calculate spatially disaggregate indicators. The indicators can be combined, via user-defined weights and value judgments, to develop indices of performance in the three basic sustainability dimensions (Lautso and Toivanen, 1999). The indices facilitate the analysis of a large number of policies according to aggregate performance on the three dimensions (environmental, social and economic), enabling sustainability to be measured in relative terms.

As part of another multicity European initiative funded by the EU, the PROSPECTS project starts with an explicit definition, maps objectives and sub objectives to that definition, and develops indicators relevant to each sub objective (Minken et al., 2003). It proposes a three-level indicator structure, roughly corresponding to data and analytical technique availability.

Black et al. (2002), looking at the Sydney, Australia case, simply bypass indicator development by accepting the New South Wales government's defined vehicle-kilometers of travel (VKT) targets for 2010 as the primary sustainability indicator. They go on to look at variations in motor vehicle VKT based on differences in urban form across Sydney's 40 local government areas.

A number of more thorough reviews of indicator efforts exist, such as Lee et al. (2003), Jeon and Amekudzi (2005). These reviews lead to two observations (Dimitriou and Gakenheimer, 2011):

- ✧ The overwhelming number of indicators derived; and
- ✧ The oft-committed failure to clarify the links between the proposed metrics and the objectives (the UE-supported SPARTACUS and PROSPECTS

projects are notable exceptions).

This range of multiple indicator initiatives represent ambitious efforts to provide a comprehensive picture of sustainable transport from a range of perspective, such as the business sector (WBCSD, 2004), the social advocate (Litman, 2001) or the academic (Lee et al., 2003). They also reflect different purposes, different scales and, to some extent, different value systems. Without integration of these measures, or some way of making the indicators explicitly comparable, the multiple indicator efforts make it difficult to gauge progress towards sustainability (Dimitriou and Gakenheimer, 2011).

2.2.5 Measuring service level performance from different viewpoints

A recent and very comprehensive study of performance measures for transit was performed under the Transit Cooperative Research Program by Kittleson and Associates, et al. This study identified the key aspects of an "Effective Performance-Measurement System" as follows (TCRP, Report 88, 2003):

- ✓ Stakeholder Acceptance –is vital for a program's long-term viability and usefulness.
- ✓ Linkage to Goals –it should be clear what goal(s) the measure will help achieve.
- ✓ Clarity –the program's intended audience should understand the performance measures.
- ✓ Reliability and Credibility –measures should be based on accurately and fairly assessing performance and whether they can be used as a tool to measure goal achievement.
- ✓ Variety of Measures –measures used should reflect a broad range of relevant issues.
- ✓ Number of Measures –the need for a variety of measures must be balanced to avoid overwhelming the end user with superfluous data.
- ✓ Level of Detail –measures should be sufficiently detailed to allow accurate identification of areas where goals are not being achieved, but not more complex than needed.
- ✓ Flexibility –provide the flexibility to permit change, while retaining links to historical measures.
- ✓ Realism of Goals and Targets –targets should be realistic, but slightly out of reach.
- ✓ Timeliness –allows all to understand the benefits that resulted from service improvements and allows agencies to quickly identify and react to problem

areas.

- ✓ Integration into Agency Decision-Making –carefully consider what the performance results are indicating, and use results to evaluate the success of past efforts and to develop ideas for improving future performance.

The authors assign transport agency performance measures to the following eight primary categories (TCRP, Report 88, 2003):

1. Availability –when and where service is provided, and sufficient capacity
2. Service delivery –reliability, customer service, passenger loading, and agency goal accomplishment
3. Safety and security –the likelihood of being involved in an accident or becoming the victim of a crime while using transit
4. Maintenance and construction –the effectiveness of the agency's maintenance program and impacts of construction projects on agency staff and passengers
5. Economic –evaluation of performance from a business perspective, including use, efficiency, effectiveness, and administrative measures
6. Community –transit's impacts on individuals and the community as a whole
7. Capacity –the ability of transit facilities to move both vehicles and people
8. Travel time –how long a transit trip takes, both by itself, and in comparison to another mode or an ideal value

Furthermore, the following **Tables 2-2a** and **2-2b** list the performance indicators that are related to the primary categories of TCRP, Report 88 (2003), those who are the key actors in managing urban public transport in medium-sized city of Indonesia such as service provider, transport authority and customer. The aim of this framework is to identify and test indicators that can measure urban transport service performances in valid ways that are meaningful to the key stakeholders. Performance indicators are used to observe progress of urban bus projects and to measure actual results compared to the prevailing international standards.

Table 2-2a Setting performance indicators (service provider/transport authority)

Performance Indicators/Indices	Definition	Influencing Factors
SERVICE PROVIDER		
Vehicle availability	Average number of vehicles available for service during the peak period	The effectiveness of the maintenance arrangements
Vehicle utilization	Percentage of the number of buses available for use	Demand level, route setting, bus scheduling system
Average daily km per bus	The number of kilometers operated daily per licensed vehicle	Operating speeds, proportion of idle to running time, and hours of operation each day
Passenger per vehicle per day	Total number of passengers carried divided by total number of vehicles licensed	Demand, vehicle capacity, length of operating day, length of route, average distance traveled per passenger, and the kilometers operated/bus/ day
Load factor	Dividing passenger kilometers by place kilometers	Demand level, route setting, service level provided
Total staff per licensed vehicle	Number of staff employed divided by the total number of vehicles licensed	Levels of productivity and efficiency, the length of the operating day
Driver per license vehicle	Number of driver employed divided by the total number of vehicles licensed	The amount of duty/shift during each day
Conductor per licensed vehicle	Number of conductor employed divided by the total number of vehicles licensed	The amount of duty/shift during each day
Other traffic staff per licensed vehicle	Number of other traffic staff employed divided by the total number of vehicles licensed	The amount of duty/shift during each day
Maintenance staff per licensed vehicle	Number of maintenance staff employed divided by the total number of vehicles licensed	Levels of productivity and efficiency, the length of the operating day
Adm. & management staff per licensed vehicle	Number of administration and management staff employed divided by the total number of vehicles licensed	Levels of productivity and efficiency, the length of the operating day
Kilometers per employee per day	Total number of kilometers operated per day, divided by the number of employees.	Levels of productivity and efficiency, the length of the operating day
Kilometers per driver per day	Total number of kilometers operated divided by the number of drivers employed	Levels of productivity and efficiency, the length of the operating day
Cost recovery ratio	The ratio of fare revenue to total operating costs, and is a key indicator of financial performance	The size of an operator, fares paid by passengers, and control of revenue
TRANSPORT AUTHORITY		
Hours of service	How long service is provided during a day	Ridership, hours of operation at desired origins and destinations, maintenance needs (for vehicles, guide ways, stops, and stations)
Travel speed	Average speed that urban bus travel during revenue service	Roadway congestion, boarding and alighting time, overall trip length, transfer requirements, dwell time, number of stops along route, number of boarding/alighting along route, walking time, waiting time, fare collection time, vehicle characteristics, traffic control devices along the route
Frequency	The number of vehicles per hour	Passenger demand, loading standards, liability issues (need to avoid standees), time of day, direction, policies requiring service provision in certain areas
Percentage of urban area within 500m of bus stop	A measure of the coverage of a bus route network	Public transport planning, the road system, links between the routes
Number of buses per 1,000 people	The number of buses required per 1,000 population	Public transport mode share, the presence or otherwise of rail or other public transport modes, the capacity of the buses, daily kilometers per bus, and the daily number and average length of bus journeys undertaken by each inhabitant of the city
Affordability indices	The financial burden households bear in purchasing transportation services, particularly those required to access basic goods and activities such as healthcare, school, and work	Household income, household expenditure on transportation

Table 2-2b Setting performance indicators (customer)

CUSTOMER					
Customer Satisfaction Indices		*Local Residents*		*Foreign Users*	
Route characteristics	Availability bus stop near home and destination	Service quality	Frequency & reliability	Service quality	Frequency and reliability
	Number of bus stops, distance between bus stops		Safety & security		Safety and security
Service characteristics	Operation hours		Customer service & information availability		Customer service and personnel appearance
	Service frequency	Subsidy and fare	Affordability of fare	Information and English guidance	Availability of map/route at bus stops in English
	Availability of shelter and benches at bus stop		Effects of subsidization		Availability of service information in English by phone, mail, internet
Service reliability	Reliability of buses that come on the specified range		Distribution of subsidies		Availability of information on buses in English regarding bus stops, transfer points
	Vehicle reliability & competence of drivers	Satisfaction	Satisfaction with overall services	Satisfaction	Satisfaction with overall services
	Length of staying on board		Satisfaction with comfort		Satisfaction with comfort
Information	Availability of map/route at bus stops		Satisfaction with helpfulness of personnel		Satisfaction with helpfulness of personnel
	Availability of service information by phone, mail, internet	Loyalty	Loyalty to use Trans bus if service quality improved	Willingness take trip by urban bus	Consider/return to use if service quality improved
	Availability of information on buses regarding bus stops, transfer points		Loyalty to use Trans bus if the overall services satisfy		Consider/return to use if the services satisfy
	The ease to submit complaint, request, opinion		Loyalty to use Trans bus if the fares affordable		Consider/return to use if the service is safer
	Follow up of the complaint, opinion				
	Availability of parking at terminal & cost				
Comfortable	The ease of payment				
	Quality of air conditioning on bus				
	Cleanliness of interior, seats & windows				
	Bus overcrowding				
Safety and security	Safety against crimes on buses				
	Security at the bus stops while waiting for the bus				
	Helpfulness of personnel				
Fare	Ticket cost				
Environmental	TransJogja effect on emission				
	TransJogja effect on congestion				
	Road accident caused by TransJogja				
	Road deterioration caused by TransJogja				
	Effect of TransJogja to the economics, social, cultural & tourism				

2.3 EMPIRICAL STUDIES ON EVALUATING URBAN TRANSPORT SERVICE QUALITY

Performance measures can monitor how well service is performing at a specific time. Measures can determine if goals are being met, are not being met, or are being

exceeded. Service trends can also be ascertained through performance measures. Urban transport authorities implement policies and procedures designed to improve performance. Performance measures allow authorities to determine the effect of the changes through the use of before and after studies. Any before and after study should attempt to account for variables that may have caused the change, so it can be determined that some or all of the performance change resulted from the change in policy or procedure. External environmental changes can be assessed in a similar manner.

2.3.1 Developed countries

- *European Union: International Perspective*

The intent of the European Union's Quality Approach in Tendering/Contracting Urban Public Transportation Operations (QUATTRO) project is to "develop and improve quality in urban public transport tendering, contracting, and monitoring procedures." (1998). The project includes 20 partners from eight European Union countries, plus Norway, Poland, Hungary, and the Baltic States.

Four classes of service quality are considered in detail in the QUATTRO project. These classes are:

- ✓ *Expected Quality.* "This is the level of quality anticipated by the customer and can be defined in terms of explicit and implicit expectations. The level of quality expected by the passenger can be defined as the sum of a number of weighted quality criteria. Qualitative and quantitative surveys can be used to identify these criteria and to assess their relative importance."
- ✓ *Targeted Quality.* "This is the level of quality that the operator aims to provide to passengers. It is dependent on the level of quality expected by the passengers, external and internal pressures, budgetary constraints, and competitors' performance.... It is made up of an identified service, a level of achievement for that service, and a threshold of unacceptable performance."
- ✓ *Delivered Quality.* "This is the level of quality that is achieved on a day-to-day basis in normal operating conditions. Service disruptions, whether or not they are the fault of the operator, are taken into consideration. The relevant measurements are established using statistical and observation matrices."
- ✓ *Perceived Quality.* "This is the level of quality perceived by passengers in the course of their journeys. However, the way passengers perceive the service depends on their previous personal experiences with the service or with its associated services….Perceived quality is therefore subject to bias."

QUATTRO identifies safety and security, cleanliness, waiting time/frequency, information, ticketing system, and staff/driver attitude as features that public transport agencies should always include in customer satisfaction surveys. Punctuality, speed, and response to correspondence are occasionally included. QUATTRO addresses the types of surveys that can help evaluate public transport service quality and offers guidance on developing customer satisfaction indices.

- *Sidney, Australia: Private Operator*

Busways operates 310 buses from 5 main depots in the Sydney metropolitan and Central Coast areas. It carries over 100,000 passengers daily and serves mainly the commuter and school markets. It employs over 550 staff. Busways started life as a one-bus operation in Sydney in 1942, and it has become the second largest private bus operator in the region. Several studies in the 1990s identified Busways as one of the most efficient bus operators in Australia, in terms of cost recovery levels. The company continues to provide an adequate return on investment for its owners.

The company's major performance efforts are designed to achieve its three main overall goals, namely,

1. **Customers** and potential customers should be provided with an efficient, effective, and safe system.
2. **Employees** should be provided with a working environment that will enable them to enjoy a high level of job satisfaction.
3. **Owners** should enjoy an adequate return on their investment to enable the business to continue to grow.

To achieve the three main company goals, there is an emphasis on "customer care" and on cost-efficient operations. These two areas are:

✧ ***Customer Care***

Patronage levels are monitored by time period (i.e., a.m. peak, p.m. peak, off-peak, and weekend). Contracts with government agencies provide for revenue from two sources, namely,

- School transportation (based on a percentage of the number of school children with bus passes, currently set at 77%).
- Pensioner (senior) trips (50% concessional, or discounted, fares applies to pensioners).

The government transportation planning agency sets minimum frequencies for peak and off-peak time periods, and operators are free to exceed those minimums as they see fit.

Busways operates frequencies which are higher than the minimum level for all time periods. There has been a conscious decision to provide a "comprehensive" level of service in the areas under Busways operations. This means providing bus frequencies during off-peak periods (including night times) and weekends, which would not normally be provided on a direct cost recovery basis. These services are cross-subsidized within the company, to maximize customer loyalty and to encourage customers to continue to use public transport, rather than buying a second car, for example.

In addition to monitoring on-time running (drivers radio-in when delays are longer than 10 minutes and appropriate action is taken), there is an emphasis on using three dedicated staff to perform customer service duties exclusively, on a roaming basis throughout the system. These employees are in direct contact with customers and are used as the "eyes" and "ears" of management to ensure that the operating plan works successfully. They also act as "troubleshooters" to solve on-the-spot problems (e.g., ticketing issues and missed connections). The bus/rail interchange is an important task for Busways at five main railway stations. During peak times (3 p.m. to 7 p.m.) at these stations, coordinators are present to ensure that passengers do not miss their planned connection (each bus run is linked to a specific train that may run late at times). These coordinators are bus drivers at other times of the day. This practice allows employees to perform different functions and to experience at first hand customers' requirements and problems.

Customer information is provided at all bus shelters. Timetable information is also provided to passengers at stops where there is no bus shelter, using waterproof material. Busways uses two contractors to monitor performance on buses and at bus/rail interchanges. By traveling as passengers, these contractors are not recognized by the staff and are able to report to management on the performance of drivers (customer relations) and on any other problem encountered by passengers. These reports are provided directly to the General Manager. Customer service is monitored by the use of customer surveys which are conducted at regular intervals. In more recent times, there has been a move to conduct surveys of potential customers using other than on-board bus surveys, such as local newspapers and mailbox drops.

Busways also employs an Infrastructure Planning Manager and an assistant who consistently work with local councils, Roads & Traffic authority, and other infrastructure developers to ensure that all planned developments are "bus friendly" and the necessary bus priority measures are introduced. In new development areas, this staffs ensure that the roads are built to accommodate large buses. Busways also attempts

to provide services to the new area as soon as the first houses are being built. While this is unprofitable in the short term, it ensures that long-term loyalty is maintained.

✧ ***Cost-efficient Operations***

The usual financial and operational indicators are used to monitor and report performance, including

- Revenue, expenses, and cost recovery;
- Patronage;
- Kilometers run;
- Revenue per kilometer;
- Passengers per vehicle-kilometer;
- Cost per vehicle-kilometer; and
- Passengers per employee.

There has been a policy of standardizing the bus fleet so that all buses are of approximately the same size. This allows easy interchanging of buses on different runs as well as reducing operating and maintenance costs, through standardization and economies of scale. The company monitors maintenance costs and fuel consumption continuously. The latter is monitored for every bus, and a rate in liters per 100 kilometers (the metric version of miles per gallon) is calculated on a weekly basis. The reports are analyzed at the maintenance manager level and action is taken for abnormal consumption rates. Maintenance costs are monitored and the results for each depot are compared. The management of the maintenance function receives significant attention (the Director of Maintenance has overall responsibility and works with Group maintenance managers and with individual Workshop managers). Scheduling (bus and crews) has eight full-time employees to ensure that dead running is minimized and that overall efficiencies from the use of software are achieved in practice.

The main lessons from Busways relate to customer-centered performance, coupled with a very cost-conscious management outlook. This cost minimization relates to identifying inefficiencies, rather than on cutting services. Busways relies more on first-hand performance monitoring, with an emphasis on customer contact, to gain a good understanding of needs and problems. In particular, the use of “station coordinators” at bus/rail interchanges has proved very successful for Busways. This reliance on a human face to monitor performance means that the quantification aspects of measurement play a secondary role to the direct employee contact.

2.3.2 Developing countries

In most developing cities, rapid population growth from natural increase and rural-to-urban migration has overwhelmed formal transport modes and pressure to provide for ever-increasing volumes of movement has taken precedence over measures to protect the city from the effects of congestion and pollution. But the density of demand and low operating costs make bus services potentially profitable. A wide variety of bus management strategies are adopted in third world cities, many of them aimed at accommodating the highest volume of demand, at whatever level of quality can be afforded by users. The level of service quality that can be afforded by users is often very low (GTZ, 2004).

- *Singapore and Hong Kong: Restraint of Private Vehicles and Integrated Public Transport*

The most successful cities in the developing world in achieving a balance between public and private transport were Singapore and Hong Kong. In both cities the shortage of developable land has dictated a policy of maintaining a high proportion of trips by public transport. Both cities have been able to pursue consistent transport policies over several decades which rest on three principles:

- ✧ development of transport infrastructure;
- ✧ improvement of the public transport system;
- ✧ managing the demand for road use.

Strong economic growth and high population density has enabled substantial investment in rail mass transit networks, supported by high quality, privately-owned bus systems run by large companies. Public transport in both cities is run on commercial principles, supported by restraints on the ownership and use of private vehicles. For example, in 1975, Singapore first implemented an Area Licensing Scheme (ALS) which required motorists to purchase a paper license before entering the central area. In 1998 this was replaced by an automated Electronic Road Pricing (ERP) system which uses congestion pricing to maintain optimal traffic speeds of 45 to 65 km/h on expressways and 20 to 30 km/h on arterial roads (Litman, 2013). In both Hong Kong and Singapore, rail mass transit was vested in autonomous public corporations, structured with a longer-term view of sale to the private sector. Hong Kong has successfully sold a proportion of the shares of its Mass Transit Railway Corporation.

It is interesting to note that the institutions responsible for implementing the transport management policies of both Hong Kong and Singapore (until 1995) were government departments – in Singapore the Registry of Vehicles and the Road and

Transport Division of the Public Works Department, and in Hong Kong the Transport Department. There were appointed boards of experts and laymen (PTC in Singapore and TAC in Hong Kong) but these were advisory only. The government departments and operating corporations were well coordinated at policy level by central government – in Singapore by the Land Transport Division of the Ministry of Communications and in Hong Kong by the Transport Bureau of the Government Secretariat, through coordinating committees.

The examples of Hong Kong and Singapore demonstrate that integrated transport policies and programs can be successfully implemented by government departments, even where the public transport sector comprises a mix of public corporations and privately owned companies. Keys to success are:

- ✓ the continuity of governments' policies – both Singapore and Hong Kong have consistently maintained their basic urban transport policies for thirty years;
- ✓ adequate professional expertise, supplemented where necessary by contracted specialists and consultants;
- ✓ financial discipline;
- ✓ effective regulatory and co-ordination mechanisms that subjugate all agencies and transport operators to basic policy objectives.

While Singapore increased the degree of integration by merging government's transport institutions into a single Land Transport Authority, in Hong Kong, the institutions remain separate, and the co-ordination of different agencies and operators is the responsibility of a central transport policy bureau.

Moreover, Singapore presents an example of a well-planned and systematic performance of evaluation system, where each policy objective is clearly translated into measurable targets and performance indicators. A systematic approach on measuring public transport performance is presented in **Figure 2-2**.

In order to maintain of customer loyalty, satisfaction with bus services improved for the second year in a row, improving by about 2% points to 90.2%, with the biggest improvements in customer service, as well as service information, reliability and comfort (Figure 2-3). These improvements could be attributed to the 550 additional buses injected into the public bus network since the start of the Bus Service Enhancement Programme, to introduce new services and improve existing services.

Singapore has helped to show that maintaining and developing coordinated public transport, particularly alongside car restraint measures, is integral to the success of transport in a city and is best realized when fares offset costs. Buses provide feeder services to MRT and fares and timetables for rail and bus services are integrated.

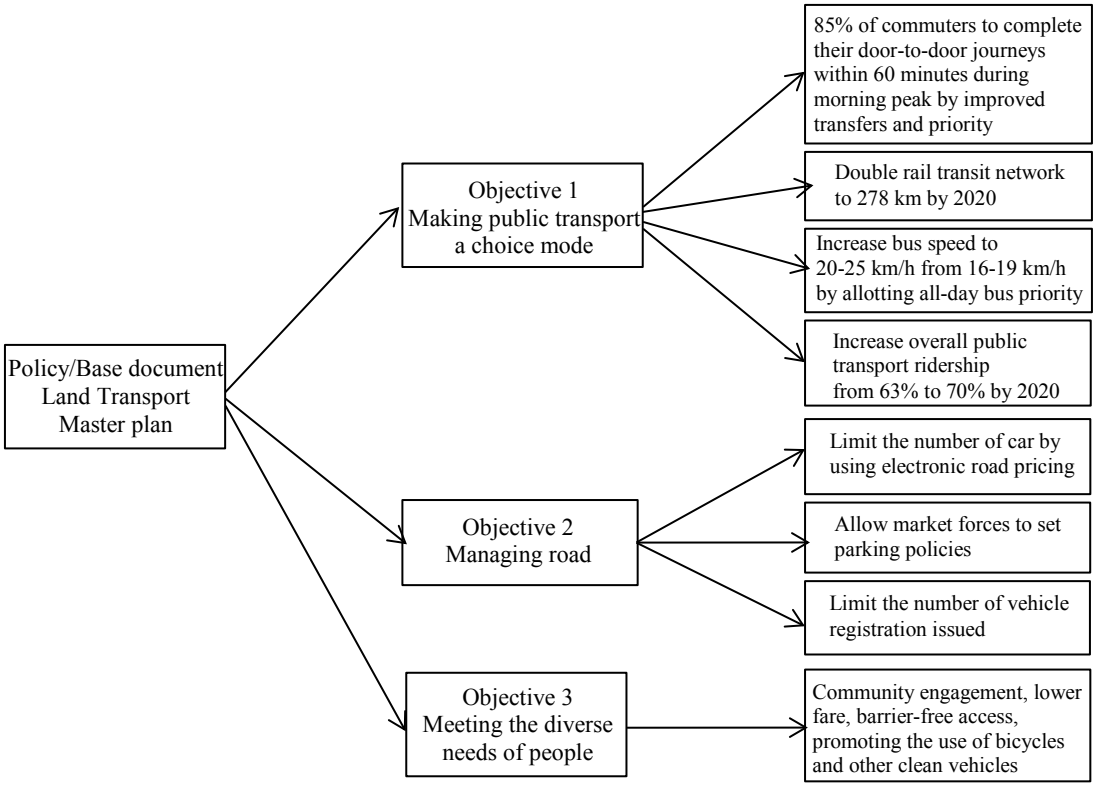


Figure 2-2 Systematic performance evaluation system

(Source: LTA, 2013)

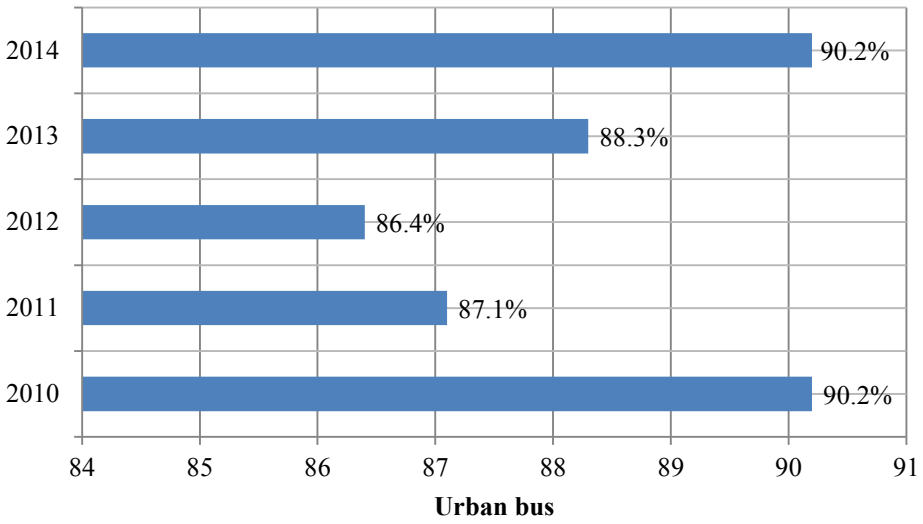


Figure 2-3 Customer satisfaction results

(Source: LTA, 2013)

Singapore boasts the world's first stored-value fare card that can be used interchangeably for bus and rail travel. Officials have also recognized that the MRT

system needs to be expanded and are seeking to upgrade feeder connections and add tertiary systems such as "travellators" and grade-separated sidewalk networks.

Singapore also offers an excellent example of a well-defined policy, policy objectives and targets under each objective for ensuring a sustainable urban transport system. This is something that other cities of developing countries could emulate and learn from (GIZ, 2011).

Meanwhile, Citybus Limited is one of the franchised bus operators on Hong Kong Island. It operates 108 bus routes, including 59 Hong Kong Island routes, 29 cross-harbour routes, 1 New Territories route and 19 routes to Tung Chung/Airport. As at 31 December 2013, Citybus had 952 licensed buses. In 2013, it carried about 643,000 passengers a day. In order to collect views on the performance of the Citybus Limited (franchise for Hong Kong Island and Cross-Harbour Bus Network) the Transport Department has conducted passenger opinion survey via telephone interviews between November and December 2013. The target population is the regular passengers aged 12 or above who take Citybus at least once a week. In order to ensure the findings of the survey are representative, a random sample of household telephone numbers were selected. The questionnaire includes eight core questions covering the following aspects of the service performance:

- Overall quality of service
- Level of comfort of buses
- Facilities on buses
- Passenger information
- Reliability of bus services
- Driving performance of bus drivers
- Service attitude of bus drivers or staff
- Performance of the bus on environmental protection

In total, 600 individuals were successfully interviewed during the survey period between 19 November and 15 December 2013, representing an overall response rate of 85.3%. Survey results are as follow:

- ✧ Overall speaking, 87.9% of the respondents indicated that they were very satisfied/satisfied with the overall quality of the service provided by Citybus. The percentage was much higher than the 12.1% who were dissatisfied/very dissatisfied.
- ✧ 85.3% of the respondents indicated that they were very satisfied/satisfied with the level of comfort of the buses of Citybus. The percentage was much higher than the 14.4% who were dissatisfied/very dissatisfied.

- ✧ 91.2% of the respondents indicated that they were very satisfied/satisfied with the facilities on the buses of Citybus. The percentage was much higher than the 7.4% who were dissatisfied/very dissatisfied.
- ✧ 86.4% of the respondents indicated that they were very satisfied/satisfied with the passenger information provided by Citybus. The percentage was much higher than the 11.8% who were dissatisfied/very dissatisfied.
- ✧ 70.5% of the respondents indicated that they were very satisfied/satisfied with the reliability of bus services of Citybus. The percentage was higher than the 29.3% who were dissatisfied/very dissatisfied.
- ✧ 92.5% of the respondents indicated that they were very satisfied/satisfied with the driving performance of Citybus. The percentage was much higher than the 6.8% who were dissatisfied/very dissatisfied.
- ✧ 91.9% of the respondents indicated that they were very satisfied/satisfied with the service attitude of drivers or staff of Citybus. The percentage was much higher than the 6.8% who were dissatisfied/very dissatisfied.
- ✧ 71.7% of the respondents indicated that they were very satisfied/satisfied with the performance of the buses of Citybus on environmental protection. The percentage was higher than the 16.6% who were dissatisfied/very dissatisfied.

• *Seoul: From bus-centered road transport to efficient transportation*

In 2004, the Seoul Metropolitan Government (SMG) carried out reforms in its public transportation system, through which Seoul has emerged as a model city for public transportation. It replaced the previous unreasonable bus routes with a Hub-and-Spoke based dual system of trunk and feeder lines. In addition, regarding some problematic bus routes with too many curves or redundant long-range services, overhaul was made in a way that operation efficiency could be maximized. Also, connectivity between mass transits was enhanced. Keys to success are (SMG, 2013):

- ✓ Reorganization of the bus route system
- ✓ Introduction of a median bus lane system
- ✓ Introduction of a quasi-public bus operation system
- ✓ Establishment of an integrated public transport-fare card system
- ✓ Improvements in bus vehicles

1. Reorganization of the bus route system

Previously, bus routes were divided into city, express, and circular. As a result of the 2004 reforms, the bus service in Seoul is classified into four categories:

inter-regional, trunk, feeder, and circular line services. The buses are color-coded to help citizens easily identify them (**Figure 2-4** and **Table 2-3**). As of 2013, a total of 7,485 buses that run 361 routes are operated by 66 companies.

Instead of the previous numbering system with virtually no significance at all to the citizens, the new bus numbers clearly indicate where buses originate from and end their trips.

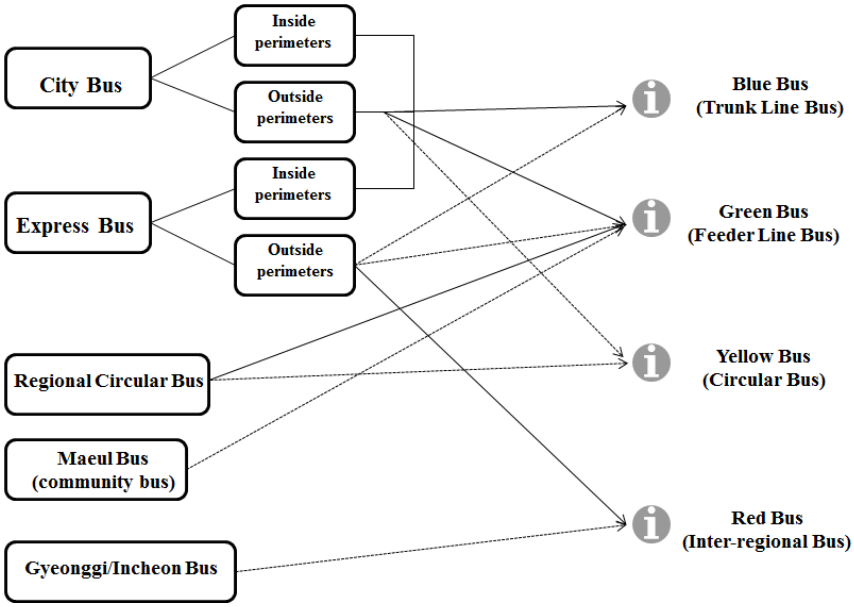


Figure 2-4 Reorganization of the bus route system

(Source: SMG, 2013)

Table 2-3 Distinctive roles of trunk and feeder line

(Source: SMG, 2013)

Trunk Lines	Blue Bus	•Connect the city center, subcenter, and suburbs •Focus on mobility and punctuality
	Red Bus	•Connect the metropolitan area with the (sub) CBDs •Meet motorists' demand for travel to the city boundaries
Feeder Lines	Green Bus	•Connect to the trunk lines and the subway •Meet the intra-regional travel demand
	Yellow Bus	•Offer circular operation within CBDs or sub center •Meet the travel demand within CBDs or sub center

Since the reorganization of the bus route system, bus operations in Seoul have improved considerably in both mobility and accessibility, marking a turnaround from the downward spiral in ridership (**Table 2-4**).

Table 2-4 Results of the bus route reform

(Source: SMG, 2013)

Goal	Evaluation Index	Improvements
Mobility	Bus operation speed (km/h)	17.2 (2003.11) → 18.1 (2004.11)
Accessibility	No. of subway stations connected per route	9.66 (2002.10) → 10.3 (2005.6)

2. Introduction of a median bus lane system

Along with reforms in bus routes, SMG introduced the exclusive median bus lane system in 2004. Since then, the bus service has become much faster. SMG has continued to expand its BRT network. Currently, the network covers a total length of 115.3 km (as of 2014). SMG will expand it to 210.5 km in the coming years. Optimization of bus operations are focus on punctuality, faster service, and maximum convenience for the citizens The exclusive median bus lane system also means that the buses are given the propriety on the roads. Moreover, median bus stops have reinforced passengers' convenience and safety with their comfortable shelter functions and cutting-edge bus information systems. Through the implementation of exclusive median bus lanes, bus speeds have improved by an average of 30%.

3. Introduction of a quasi-public bus operation system

The SMG laid the foundation for efficient and reasonable operation of public transportation by jointly managing the operating revenues and transferring the rights to route decisions to citizens with the introduction of a quasi-public bus operation system. Also, the SMG prepared institutional arrangements to improve the environment in which the bus companies operate in order to boost the overall quality of the bus service in Seoul. Private bus companies' selective operation of buses on profitable routes was a concern for SMG as it was against the public interest and deteriorated the quality of the bus service. To address this problem, SMG introduced the quasi-public bus operation system in which Seoul manages the bus routes and the revenues while the private companies operate the buses (**Table 2-5** and **Table 2-6**).

Table 2-5 Reasons for introducing the new system

(Source: SMG, 2013)

External factor	•Increase in car ownership (leading to congestion) •Completion of Subway Lines 5-8 •Expansion of Maeul (community) bus services
Internal factor	•Failure to make reasonable changes in routes due to companies' exclusive route ownership •Bus companies' financial difficulties due to higher costs and lower ridership •Growing dissatisfaction with bus services among the bus passengers •Lack of strong external motivation for profit creation •Bus companies' difficulties in hiring drivers and workers due to low wages
Policy factor	•Failure to make changes in routes due to companies' resistance •Excessive regulation on bus company operations •Insufficient support for bus companies' management and limited opportunity for citizens' participation •Lack of mid- to long-term policies on the city's bus services

Table 2-6 Before and after reforms

(Source: SMG, 2013)

Before (private operations)	After (quasi-public operations)
•Revenues collected by individual bus companies	•Revenues jointly managed by SMG and bus companies
- Revenue depending on ridership	- Revenue depending on the service distance (km/bus)
- Suspension of unprofitable routes	- Subsidy to offset losses from unprofitable routes
•Excessive competition leading to poor services	•Competition for service quality improvements
•Bus companies' rejection of unprofitable routes	•Reorganization of bus routes based on citizens' demand

4. Establishment of an integrated public transport-fare card system

Through the reforms of 2004, SMG has integrated all the public transport charging systems into one that applies not just to Seoul but also to the entire Seoul metropolitan area. Moreover, it charges based on the total travel distance of passengers instead of the number of trips. Previously, different modes of transportation charged for trips independently, not based on the person's total travel distance. The new charging system has reduced citizens' burden of transportation costs considerably. Furthermore, SMG has expanded its integrated public transport fare card system to all transportation modes operating in the Seoul metropolitan area in collaboration with other local governments in the area and Korail.

5. Improvements in bus vehicles

In order to improve the air quality of Seoul which is affected by ultra-fine dust and exhaust, SMG has replaced its diesel-based buses with CNG buses, which emit less

exhaust and are more economical. SMG is now focusing its efforts on replacing Maeul buses -which travel around in communities and residential areas- and tourist buses with eco-friendly bus vehicles. SMG joined forces with local bus manufacturers to develop electric buses free of exhaust or noise. In December 2010, SMG began to operate electric buses around Mount Namsan and the downtown area. At present, electric buses run through the Seoul Zoo and around the Seoul Energy Dream Center. SMG began to introduce low-floor buses in 2003 to help those with disabilities as well as children and seniors. It now runs 2,703 low-floor buses which account for 29.9 percent of the total number of buses under operation (as of May 2013).

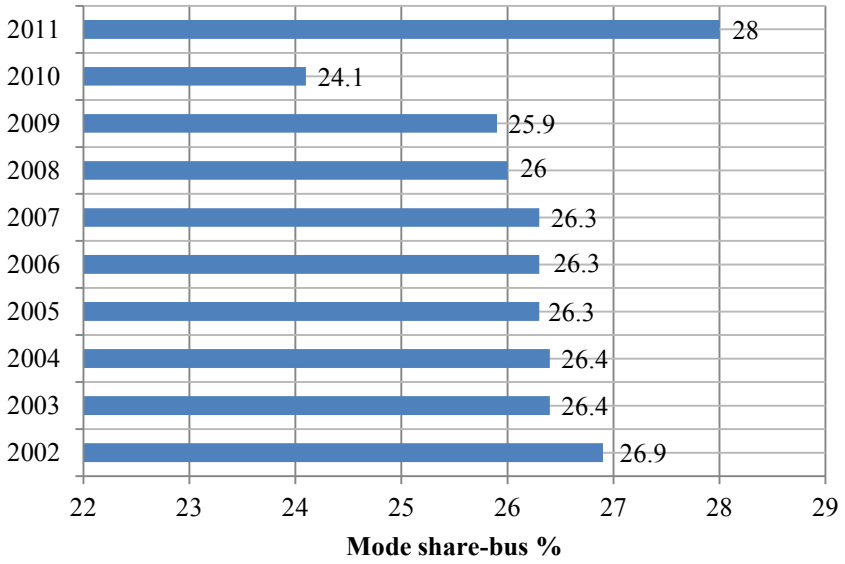


Figure 2-5 Mode share of urban bus service

(Source: SMG, 2013)

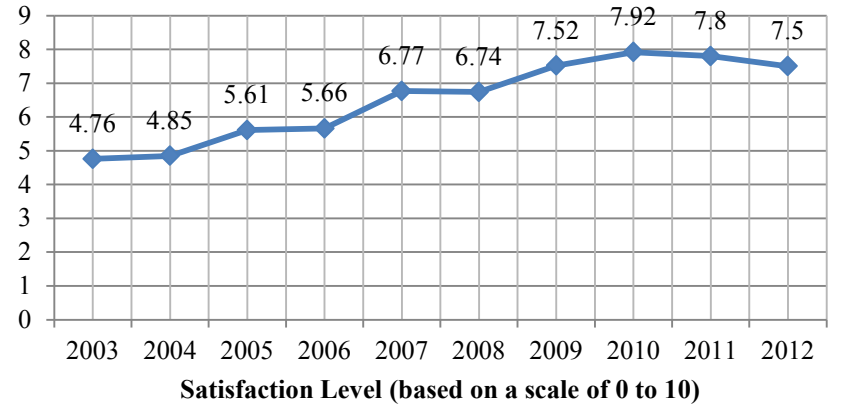


Figure 2-6 Customer satisfaction level of public transportation service

As a result of public transportation reform, modal share of public transport reached 65.1% as of 2011 (with bus and subway accounting for 28% and 37.1%, respectively). (Figure 2-5). While customers' satisfaction level with the reorganized public transportation service kept rising, and reached the 7.5 mark on a scale of 0-10 in 2012 (Figure 2-6).

2.3.3 Indonesian cities

New developments in the urban transport sector in Indonesia promise to counter the trend of increasing greenhouse gas emissions in this sector. Jakarta's nascent bus rapid transit (BRT) system has begun to re-allocate scarce road space in the center of the city to efficient public transportation and has already resulted in a shift of trips from private motor vehicles. Jakarta and other Indonesia cities also have begun to improve pedestrian facilities to increase the number of walking trips, important to the development of public transport.

The decentralization of authority and budgets following the end of the Suharto-era has meant local governments, even including DKI Jakarta, have been struggling to handle the suddenly increased workload. The Governor quite literally forced the BRT project through using agencies with no experience in conducting such a project. Jakarta implemented their first BRT corridor in only 8 months' time, making it the fastest known implementation of any full BRT in the world. However, in the process, some technical mistakes were narrowly avoided, and others were made and need to be corrected. Intervention from ITPD and Indonesian NGO partners helped to bring about public support for the BRT despite the shortcomings, while technical support helped to fix some design shortcomings. Without early information on BRT being brought to Jakarta, the busway would have been in the curb lane, for instance, and the enclosed bus stops would have only been about 10 square meters in size. Other advice was not able to be incorporated in time during the system's rapid implementation.

As a result, Corridor 1 Blok M-Kota (12.9 km's) was built with a design capacity that can only handle about 6000 passengers per direction at the peak. With proper operation and minor infrastructure changes, the capacity could readily be doubled to 12,000; adding overtaking lanes at stations would allow the capacity to reach 35,000. Already, this poor design is being used by powerful lobbying interests to argue for the replacement of the BRT system with far more expensive technologies (monorail, metro). Due to inefficiencies in its design and operation, the Jakarta BRT system is essentially at its maximum capacity already. This capacity is much lower than

the normal potential of BRT systems. Increasing the capacity of the first corridor is essential (UNEP, 2006).

While Jakarta already has a nascent BRT system, and therefore could be viewed as being on the right track, in fact this BRT system's success is far from certain. International visitors from a dozen countries, while appreciating the project's success, have also been quick to point out the system's failures. Furthermore, technical reviews of the Bogotá TransMilenio project have pointed out that it was not BRT alone that resulted in the significant reductions in greenhouse gas emissions, but rather the combination of BRT with TDM and NMT improvements. Accompanying land use changes, best exemplified in Curitiba, are also critical to long term success. For Jakarta to become the model to other cities that we all hope it will, it is critical that its current problems are fixed. Furthermore, due to the investment already made in developing the Jakarta busway, the marginal cost of improving this system to obtain further greenhouse gas emission reduction benefits is far lower than for new start-up systems where greenhouse gas emission impacts are more speculative (largely because the prospect that BRT will actually be implemented is still uncertain).

Meanwhile, other cities including Jogjakarta and Palembang indicate an interest in replicating Jakarta's pedestrian improvements and BRT system. Jogjakarta as an example, the ancient capital, is much smaller than Jakarta but an important city. It is a tourism and university city, visited by millions of people each year. Much of the congestion and pollution comes from explosive growth in motorcycles, particularly among university students. While Palembang, is a city of 1.3 million in the south of the island of Sumatra. Traffic problems are becoming widespread, with motor vehicles increasing at an annual rate of 8% during the last 5 years. The majority of public transportation vehicles are currently small paratransit vehicles which are in oversupply and in strong competition for passengers.

Originally conceived in 2004 as a 120-bus operation, the TransJogja system was developed as an innovative response to the worsening traffic conditions, and falling passenger levels and viability of the then urban bus system (bus kota). Introduced in February 2008, this system now operates four routes with a fleet of 54 buses. TransJogja however, currently has an overall cost recovery of only 30%. This is despite an average 40% load factor, and reflects in part an overstaffing constraint on the system (7.8 staff per bus). The principal reason for this high level of staffing is the 7 staff allocated to each shelter for ticket sales and system monitoring purposes. In addition, inadequate shelter coverage, poor route design, and a continuing duplication by bus kota operations are factors contributing to this overall situation (CDIA, 2011).

While In February 2010, a new TransMusi bus service of Palembang commenced on two corridors, using a fleet of 25 high-floors, air conditioned buses. Recently, TransMusi has own 120 buses, operate 8 corridors include two agglomeration corridors across the boundaries of city center. However, over the past few years of operations, service quality has been gradually decreased that make urban bus less attractive. Among others are the lack of comfort, safety and security and their unreliability. Dealing with these problems is very complex because of multiple functions is fragmented and the norm is multiple government agencies, at different levels of government with different or similar mandates in urban transport infrastructure and services. Moreover, performance measurements are rarely executed through independent contractor in response to inadequate performance.

CHAPTER 3

RESEARCH METHODOLOGY AND CASE STUDY CITIES CHARACTERISTICS

This chapter is focused on the description of the methodology applied in this research. A case study approach was selected as the most appropriate form of methodology in order to make comparative analysis. **Figure 3-1** describes the schematic diagram of research methodology. A brief explanation on the research outline is as follows: Reviewed literature regarding scope of study was presented in previous Chapter 2. This chapter presents the selection criteria of case study cities in developing countries and appropriate indicator measures for evaluation, characteristics of study areas, methods of questionnaire designs and field surveys, and analysis and modelling techniques. This research begins with assessment of the service provider's performance throughout service quality delivered as well as management capability in terms of organizational forms, and distribution of subsidy benefits by income groups, and related results are presented in Chapter 4 and Chapter 5. In Chapter 6, study described in detail on transport authority, role and functions performed in urban transport management compare to other in developed and developing nations. Chapters 7 to 8 focus on the measurement of service quality from the user's perspective including foreign tourists. Chapter 9 summarizes the key study findings, implications, and also recommendations for future research.

3.1 CRITERIA FOR SELECTION OF CASE STUDY CITIES

According to global standards, a medium sized city is defined as 1 million to 5 million inhabitants. Some definitions set from 200,000 to 400,000 and 100,000 through 200,000. Referring to the Spatial Planning Law No. 26 of 2007, a medium sized city in Indonesia context refers to the number of people served around 100,000 to 500,000 people. However, only the case study city of Jogjakarta, which is explored deeply, along with gaining clarity on definition, and two other cities such as Bandar Lampung and Palembang had grown to almost 1 million and 1.5 million residents, respectively. Criteria for selection are considering such factors. Bandar Lampung is the capital city of Lampung province and is now a bustling city with fast growing economy as well as the largest city of Lampung. As the gateway of Sumatra, the proximity to Jakarta has contributed a lot to the growth of the economy.

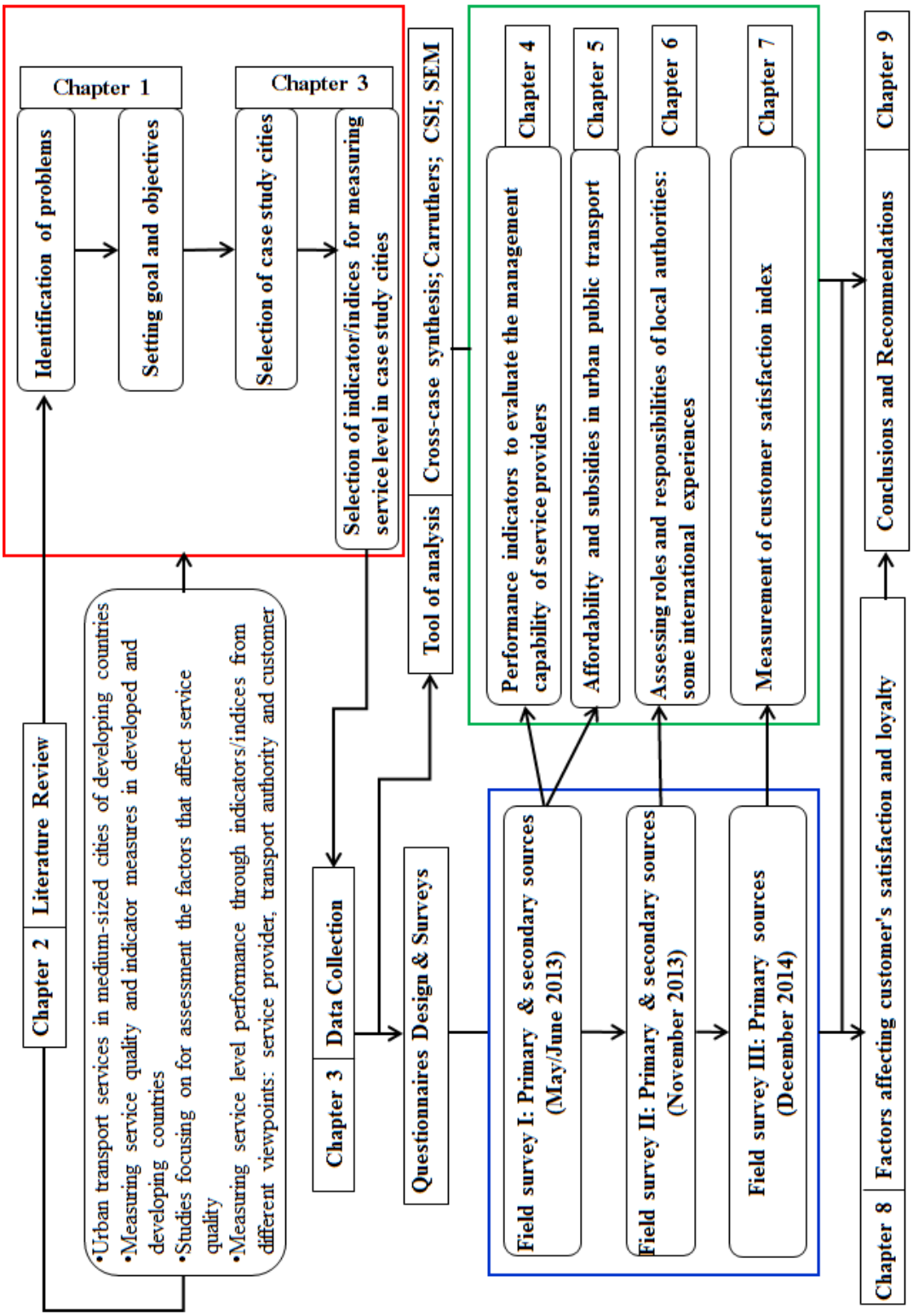


Figure 3-1 Schematic flow diagram of research methodology

While, Palembang is one of the oldest cities in Indonesia and is the second largest city in Sumatra island after Medan, and also the capital city of South Sumatra province. Palembang economy has been developed significantly since its city became a host for a national sporting event in 2004.

In 2007, the Ministry of Transportation (MoT), the Government of Indonesia, enacted a decree No. 51/2007 regulating the requirements for pilot city candidates of land transport improvement, by mandating pilot cities to reflect their commitments by providing documents declaring their preparedness in terms of institutional capacity, funding capacity, human resources availability and transportation master plan.

In accordance with central government programs, Bandar Lampung city started operating a new urban bus system, called Trans BandarLampung in September 2011. Trans BandarLampung is managed by Trans Bandar Lampung, Ltd. (TBL), which is a consortium of number private companies. Agreement between city mayor and consortium was made in the form of a Memorandum of Understanding (MoU). In the MoU stipulated obligations and rights of the city government as regulator and consortium as operator. However, with lack experience to running an urban bus business and leadership, and runs without any operating subsidies from city government, service quality delivered is currently poor. There are no requirements for bus frequency or comfort. The experience of developing countries around the world shows that **private monopolies** fail to deliver a sustainable public transport service. Poor service because of a lack of competition is a typical example. Another is the inability of private monopoly to generate sufficient funds to pay for bus maintenance and investment in infrastructure (World Bank, 2011).

The TransMusi urban buses of Palembang began launching on February 22 of 2010 with 25 buses through 2 corridors. In December 2013, this program expanded with 60 more buses and 4 more corridors added to the bus routes. This program is ongoing and when it finishes there will be about 120 buses on 8 different corridors. The Sarana Pembangunan Palembang Jaya, Ltd. (SP2J) which operates TransMusi has been established since 2006 with a vision to improve local economic growth as the main reference for channeling infrastructure investments in general, not only transportation. Before being appointed as the managing body of TransMusi in 2009, the city government-owned company was dealing with a wide array of business sectors such as developer, public housing and power plant. Under a **net-cost agreement** the operator provides a specified service for unlimited period and retains all revenue. To make transport affordable, bus fares is subsidized by city government. Currently fewer than 40 buses operate on six 6 corridors around the city. A current review of urban bus

service revealed that revenues are not sufficient to cover all the costs. The Palembang local government is currently working with some agencies such as CITYNET, Seoul Metropolitan Government (SMG), CDIA, ADB, World Bank and other public and private partnerships to improve the public transportation system and provide better facilities for pedestrians, and non-motorized transport (CITYNET, 2012).

Introduced in February 2008, the TransJogja urban bus was developed as an innovative response to the worsening traffic conditions in Jogjakarta; it operates four routes with a fleet of 54 buses by a consortium, Jogja Tugu Trans, Ltd. (JTT), consisting of four co-operatives and one state-owned bus company. The UPTD Trans Jogja, under the authority of provincial transportation agency of Jogjakarta Special Region, will collect all fares and pays fee per vehicle-km travelled to the operator. Normally this **gross-cost contract** is awarded on the basis of competitive tenders. During a transition period, however, negotiated area contracts may be awarded on the basis of negotiation with an incumbent bus operator (World Bank, 2011). TransJogja however, currently has an overall cost recovery of only 30%. This is despite an average 40% load factor, inadequate shelter coverage, poor route design, and a continuing duplication by conventional bus operations are factors contributing to this overall situation (CDIA, 2011).

Furthermore, case study cities describe a wide variety of practices in urban bus project reform that can provide valuable lessons. Bandar Lampung was selected because it has been facing serious challenges to its operation sustainability ever since the tendency for staffing levels, wages and other costs to rise at a faster rate than they would have done under a competitive regime. Palembang was included mostly due to significant role performed by city government in accelerating its bus improvement programed, including steps to establish partnership with some international agencies. As for Jogjakarta, it was the highest priority because representing participating institutions, including universities. It city has been formulated a sustainable urban transport sector strategy and high priority investment package for the greater Jogjakarta urban area through collaborative effort between the provincial and city governments, the Cities Development Initiative for Asia (CDIA) and its Consultants, the Sustainable Urban Transport Improvement Project (SUTIP), and a wide range of government and other community based stakeholders.

3.2 DESCRIPTION OF CASE STUDY CITIES

The case study cities have been described using a framework approach as shown in the following **Tables 3-1**, **3-2** and **3-3**. This includes the following items:

- *City characteristics*: a brief description of the feature of the city
- *City statistics*: consists of the key demographic and socio economic characteristics such as area, population, GDP per capita
- *Extent and use of urban public transport*: a brief explanation of the public transport system and figures on the mode share of transport used
- Institutional and regulatory framework: outline the main regulatory bodies, responsibilities and functions performed
- *The way to making transition to sustainable transport*: a brief description of city government responding the proposal of Ministry of Transport

Table 3-1 Description of case study 1-Bandar Lampung

Case Study 1: Bandar Lampung					
City characteristics					
Bandar Lampung is the capital and largest city of Lampung, the southern-most province on the island of Sumatra. The city acts as an inter-island hub and main gateway to Sumatra from Java. Located approximately 165 km's northwest of Jakarta. By 2005, Bandar Lampung no longer had rural areas.					
City statistics					
Area of the city (km^2)	City population (2014)	Urban population (2014)	Population density (person/km^2)	Income per capita-city (Rupiah-2010)	Income per capita-region (Rupiah-2010)
118.5	923,970	1,280,479	10,805	7,104,000	4,850,000
Extent and use of urban public transport					
(i) Public transport system					
Urban public transport is overwhelmingly dependent on road-based modes and para-transit. In order to overcome increased traffic congestion and associated problems, local government allowing private company to enter the market. Buses operated on fixed routes, with many para-transits operate within the same times and to the same places as fixed-route buses.					
(ii) Transport mode share-share (%) Source: Dishub Kota Bandar Lampung (2012)					
Private car	21.3				
Motorcycle	47.2				
Bus	6.1				
Para-transit	5.9				
"Ojek" motorcycle	3.3				
Non-motorized transport	16.2				
Institutional and regulatory framework					
The current regulation on para-transit operation system is based on route licensing. There are only two main institutions involved: they are local transportation office on city level and cooperation or associations of para-transit owners. Since para-transit are regulated individually, rather than at the route level, there is no individual operator has any responsibility for the overall level of service on the route. While, TransBandarLampung urban buses that initiated by private company running on main fixed routes through memorandum of understanding (MoU) format. In the MoU stipulated obligations and rights of the city government as a regulator and TBL as operator, but there are no clearly requirements for bus frequency, service hours, or comfort.					
The way to making transition to sustainable transport (Source: Urban bus toolkit, World Bank, 2011)					
City government allows private companies entering the market called private monopoly. There are several inherent disadvantages of a private monopoly system. Poor service because of a lack of competition is a typical example. Another is the inability of public monopolies to generate sufficient funds to pay for bus maintenance and investment in infrastructure. A privately owned monopoly, unless effectively regulated, may also have serious disadvantages. A common problem is exploitation of the users, by offering inadequate or unsatisfactory services at excessive fares.					

Table 3-2 Description of case study 2-Palembang

Case Study 2: Palembang					
City characteristics					
Palembang is the capital the South Sumatra province. Ampera Bridge, main city landmark, is a bridge crossed over 1,177 meters above the Musi River which connects Seberang Ulu and Seberang Ilir area of Palembang. It was built in 1962 and was built using the spoils of Japan and Japanese experts. However, large areas of the city are still undeveloped.					
City statistics					
Area of the city (km^2)	City population (2013)	Urban population (2013)	Population density (person/km^2)	Income per capita-city (Rupiah-2010)	Income per capita-region (Rupiah-2010)
374.03	1,742,186	3,242,186	8,668	8, 809,000	7,142,000
Extent and use of urban public transport					
(i) Public transport system					
Motorized public transport in city is provided buses, para-transits (mini-vans), ojegs (motorcycle taxis) and taxis. Currently around 2,900 para-transits and buses operate on 25 fixed routes around the city. In February 2010, a new TransMusi urban bus service commenced on two corridors, using a fleet of 25 high-floor, air conditioned buses. As October of 2014, fewer than 70 buses operate on seven fixed bus routes.					
(ii) Transport mode share-share (%) Source: Arif, 2009					
Private car	13.48				
Motorcycle	21.09				
Bus	6.62				
Para-transit	42.27				
"Ojek" motorcycle	4.02				
Non-motorized transport	12.52				
Institutional and regulatory framework					
The regulation on para-transit and conventional bus operation system is based on route licensing. Route license is given through such cooperatives with a validity period of five years and it may be renewed for one additional five-year term. The institutional arrangements required to develop and implement sustainable urban transport policies are not strong enough and the policy objectives of the various national, provincial and city agencies involved do not always coincide. There are also major difficulties at all three levels of government caused by uncoordinated planning and budgeting.					
The way to making transition to sustainable transport (Source: Urban bus toolkit, World Bank, 2011)					
City government issues a contract to agency giving him the exclusive right to operate bus services in an area that forms a substantial part of a city. In terms of reform actions undertaken it is described as net-cost contract, where the operator provides a specified service for a specified period and retains all revenue. However, contract system has not been used except a letter of appointment of city mayor that set a certain agency as single operator.					

Table 3-3 Description of case study 3-Jogjakarta

Case Study 3: Jogjakarta					
City characteristics					
Jogjakarta is renowned as a center of education and culture. At Jogjakarta's center is the Kraton, or Sultan's palace. Surrounding the Kraton is a densely populated residential neighborhood that occupies land that was formerly the Sultan's sole domain. Because of its proximity to world famous Borobudur and Prambanan temples, Jogjakarta has become the second most important tourist destination after Bali.					
City statistics					
Area of the city (km^2)	City population (2014)	Urban population (2014)	Population density (person/km^2)	Income per capita-city (Rupiah) [2010]	Income per capita-region (Rupiah) [2010]
32,50	517,000	2,393,240	73,638	6,940,000	6,631,000
Extent and use of urban public transport					
(i) Public transport system					
A bus system has been operating since 1980s but number of passenger has continued declined. The city is also served by a range of motorized and non-motorized public transport services, which provide services to local and regional destinations. Starting from early 2008, the city has operated a new urban bus system called TransJogja. Currently there are four corridors serving throughout main streets, which some overlap one another.					
(ii) Transport mode share-share (%) Source: Zudianto and Parikesit, 2003					
Private car	12.2				
Motorcycle	53.1				
Bus	7.8				
Para-transit	5.2				
"Ojek" motorcycle	3.8				
Non-motorized transport	17.9				
Institutional and regulatory framework					
The regulation on para-transit and conventional bus operation system is based on route licensing, while for TransJogja is based on a five-year contract. Route license is given through such cooperatives with a validity period of five years and it may be renewed for one additional five-year term. TransJogja operate on major routes, with such cooperatives operating conventional buses and para-transits on the same routes. According to license system urban buses are required only to operate on the route, not to provide any particular level of service such as operating hours and frequency.					
The way to making transition to sustainable transport (Source: Urban bus toolkit, World Bank, 2011)					
Provincial government issues a contract to a bus operator giving him the exclusive right to operate bus services in an area that forms all or a substantial part of a city. In terms of reform actions undertaken it is described as gross-cost contract, where the operator provides a specified service for a specified period and all revenue collected being for the account of the transport authority. Single bus operator was paid by distance travelled.					

3.3 DATA COLLECTION METHODS

Data analysis and findings of this study are based on results of questionnaire surveys and interviews in three study case cities. Indeed, case study analysis relies on a wide range of data sources include qualitative and quantitative information from provincial or city authorities and bus service providers. Furthermore, the local government officers and bus service providers in all of the case study cities are reluctant to provide financial information mainly for the reasons of confidentiality and sensitivity. Initially, forms of existing urban transportation services and existing regulatory measures were evaluated in field survey of phase-I. This survey attempts to measure service quality delivered from viewpoint of transport authorities and operators. Prevailing international standards are used to determine level of service. This survey also formed the basics and feasibility of designing and continuing the phase-II and III surveys. In phase-II survey, evaluation of urban bus system is more focused on framework of functions to be performed in the regulation, management, and delivery of urban transport services. Summary the last field survey that essential to identify the customer satisfaction with new urban bus services and perception regarding service quality was considered. Customer Satisfaction Index is used to measure perceptions and expectations, while the Likert scales were used to measure the attitudes of the customer loyalty and satisfaction. The details of these questionnaires design and related surveys are described in next subsection.

3.3.1 Questionnaire design and phase-I survey

This questionnaire was related to evaluation of new urban bus service quality in Bandar Lampung and Jogjakarta. Performance indicators measure is evaluated from viewpoints of service provider and transport authority. Various quantified performance indicators of service quality were selected such as vehicle availability, vehicle utilization, load factor, etc., to obtain management capability of operator. Moreover, operator is asked to full form and providing the latest personnel information in order to measure productivity of employees. Some of indicators used in evaluation are total staff per licensed vehicle, driver per license vehicle, maintenance staff per licensed vehicle, etc. To gather the next information from local transport authority, a set of questionnaire regarding service and operations system of urban bus was considered. The local transport officers were asked about hours of service, travel speed, percentage of urban area within 500m of bus stop, etc., include the subsidy mechanism applied. The interviews were carried out in May/June of 2013. Sometimes, interview and self-completion approach were used considering the literacy level of respondents.

Therefore, it should be noted that general information and data pertaining to the case study cities before 2013 were used in this research. The interview sheets for local transport authorities and bus operators are provided in Appendix **(Field Survey I)**.

3.3.2 Questionnaire design and phase-II survey

These surveys were giving accentuation to transport policies and more focused on strategy for establishing a sustainable development. In terms of public administration of transportation sector, the Republic of Indonesia has two levels of sub-national governments. The upper level is provinces, and the lower is regencies and cities. The laws on local government (Law No 32 of 2004 and Law No 33 of 2004) and direct election of heads of a local government, started in 2005, significantly promoted decentralization while actual governmental functions, especially the function of provincial governments remain unclear (UNDP, 2009). Although regencies and cities granted their legal authority except for foreign policy, defense, public security, system of law, and monetary policy under the new laws on local government, most of local governments are heavily dependent on financial assistance from the central government.

In this questionnaire and interview survey, local transport officers were asked to describe the organization of urban transport responsibilities within governments. Urban transport responsibilities are all those functions relating to the planning and management of the circulation of vehicles, passengers and pedestrian on the road system. They generally include (i) planning and development of transport infrastructure; (ii) management of roads and road use, including the licensing of vehicles and drivers; (iii) public transport organization, development and regulation; (iv) financing and investment; and (v) an interface with land use and urban planning. According to these range of functions of urban transport authorities, officers were asked to select the scope of urban transport responsibilities. Sometimes, interview and self-completion approach were used considering the literacy level of officers. The interviews were carried out in November of 2013 **(Field Survey II)**.

3.3.3 Questionnaire design and phase-III survey

This questionnaire was related to evaluation of service quality by customers. It consists of two parts. The first part is called customer satisfaction index survey where customer expectations and perceptions of services are measured. This questionnaire was designed to cover all service aspects of new urban transportation problems such as route characteristics, comfort, and safety and security. Further, users were asked to complete information about 8 service aspects which overall consists of as many as 27 service

attributes. Subsequently, the respondents described a rating of importance and a rating of satisfaction on each attribute on a 10-point scale. Firstly, respondents are asked to rate the satisfaction of all service attributes, ranging from 1 totally dissatisfied to 10 totally satisfied (2 very dissatisfied; 3 dissatisfied; 4 somewhat dissatisfied; 5 less dissatisfied; 6 less satisfied; 7 somewhat satisfied; 8 satisfied; 9 very satisfied). Second, respondents are asked to rate the importance of all service attributes, ranging from 1 no important at all to 10 extremely important (2 very unimportant; 3 unimportant; 4 somewhat unimportant; 5 less unimportant; 6 less important; 7 somewhat important; 8 important; 9 very important).

In second part, passengers were also asked to rate the satisfaction of and their loyalty with 12 service attributes. All the stated questions of part two were evaluated using a five-point Likert scale (i.e. strongly disagree, somewhat disagree, neutral, somewhat agree, strongly agree). This questionnaire was designed to target both local residents and foreign users of urban bus system. A total of 242 TransJogja passengers and 334 of TransMusi passengers were interviewed, in addition to 211 of foreign tourists (only Jogjakarta). Some passenger socioeconomic characteristics are asked at this step such as gender, age, marital status, place of living, number of family members, education, job, income, motorized vehicle ownership, reason for making use of urban bus, trip purpose, and overall satisfaction. For foreign users they asked to fulfill information about their foreign tourist characteristics such as origin region, reason traveled to Jogjakarta, frequency of visit, length of staying, spending money, and complaints during the visit. The interview sheets of customer satisfaction are provided in Appendix **(Field Survey III)**.

3.4 CROSS-CASE ANALYSIS

Cross-case analysis is a research method that facilitates the comparison of commonalities and difference in the events, activities, and processes that are the units of analyses in case studies. Cross-case analysis enables case study researchers to delineate the combination of factors that may have contributed to the outcomes of the case, seek or construct an explanation as to why one case is different or the same as others, make sense of puzzling or unique findings, or further articulate the concepts, hypotheses, or theories discovered or constructed from the original case. Cross-case analysis enhances researchers' capacities to understand how relationships may exist among discrete cases, accumulate knowledge from the original case, refine and develop concepts (Ragin, 1997), and build or test theory (Eckstein, 2002). Furthermore, cross-case analysis allows the researcher to compare cases from one or more settings, communities, or groups.

This provides opportunities to learn from different cases and gather critical evidence to modify policy.

3.4.1 Variable-oriented approaches to cross-case analysis

Case survey method: the case survey method (Yin, 1994, 2003) involves gathering evidence from a large set of cases so that statistical analyses can be performed on the variables pertinent to all the cases. Case surveys are challenging to carry out because researchers seldom study so many cases and they rarely find perfectly comparable cases. Furthermore, increasing the number of cases often means making assumptions of homogeneity that are simply unjustifiable. An example of a case survey method is a study of the cultural antecedents of procrastination wherein large numbers of individuals from all over the world would be analyzed as separate case studies within a case survey method.

3.4.2 Case-oriented approaches to cross-case analysis

Typologies: cross-case comparison can support the creation of clusters or families of phenomena. Sets of cases are categorized into clusters of groups that share certain patterns or configurations. Sometimes the clusters can be ordered or sorted along several dimensions. For example, Denzin (1989) suggests deconstructing prior conceptions of a particular phenomenon and then collecting multiple cases and bracketing them for essential elements and components across cases. The essential elements are then rebuilt into an ordered whole and put back into the social context. In another typologizing effort, the pathway to the outcome is inspected and compared among a set of cases. In summary, there are multiple research techniques to conduct cross-case analyses. Variable-oriented approaches to cross-case comparison tend to pay greater attention to the variables across cases rather than the case itself. Variables are compared across cases in order to delineate pathways that may have led to particular outcomes. These pathways are often represented as probabilistic relationships among variables.

A cross-case analysis was applied to examine the scope of urban transport responsibilities within governments. Moreover, both quantitative and qualitative using primary and secondary sources are conducted. Data is collected through interview and by browsing the websites, then, it is analyzed by using cross-case analysis with literature review as the consideration. A few cities that have been successful in performing effective transport authorities for the management and delivery of urban transport services are used as a comparison.

3.5 TRANSPORT EXPENDITURE AND AFFORDABILITY

Transport affordability is considered an issue of importance throughout the developing world. Empirical evidence suggests that, although transport costs as a share of household expenditure vary greatly across space and time, overall transport expenditure increases strongly with income, but tends to be regressive as transport costs consume a larger share of income among poorer households (Carruthers et al., 2005; Diaz Olvera et al., 2008). In many cases poorer households pay more (in absolute terms) for public transport trips than their richer counterparts do. Reasons for this discrepancy include the poor location of many low-income households in the urban periphery (where low demand and long travel distances push up fares) (Gannon & Liu, 1997), and a high dependence on informal transport modes with unsubsidized fares (Diaz Olvera et al., 2008). High transport expenditures are thus of concern because they can compromise a poor household's ability to access needed services and livelihood enhancing opportunities that can lead to an improvement in living conditions (World Bank, 2002). As evidence of this, various authors have cited the lower trip rates observed among low-income public transport users (Diaz Olvera et al., 2008), unreasonably low ratios of poor households' disposable income (after subtracting food and housing) to the typical public transport fare (Carruthers et al., 2005; Diaz Olvera et al., 2008), and the substitution of low-cost modes for higher-cost modes (Gomide et al., 2005).

3.5.1 Defining and benchmarking transport affordability

While the measurement of individuals' or households' expenditure on transport is (at least conceptually) straightforward, linking this expenditure to a normative notion of affordability is more problematic. Transport affordability has been defined as 'the ability to undertake transport movements (make necessary journeys to work, school, health and other social services, and make visits to other family members or urgent other journeys) without significantly constraining the ability to undertake other activities of importance' (Carruthers et al., 2005:2), but the definition of 'necessary journeys' is both nebulous and depends in important ways on trade-offs with other consumption items such as housing.

The World Bank points out that the urban poor may choose less accessible housing locations because this best serves their overall interests (in terms of availability of shelter, access to activities, and so on) (Gannon & Liu, 1997). Their high mobility needs, and the heavy burden of transport costs that results, is thus a symptom of their poverty rather than its cause. In such cases, high actual transport expenditures cannot

automatically be interpreted as evidence of the unaffordability of transport. It is for this reason that some analysts have turned to a synthetic index representing the average public transport fare for a standardized 10-km trip length and an assumed minimum desirable number of monthly trips, expressed relative to the average income of households in a city, to measure the affordability of public transport (Carruthers et al., 2005). Litman (2007) endorses the approach of linking affordability to accessibility (i.e. the range of opportunities that can be reached affordably) rather than actual mobility, to improve the evaluation of affordability benefits of transport policies.

There are, however, methodological problems when it comes to measuring expenditure, including problems of definitional inconsistencies (Carruthers et al., 2005) and dependencies on the type of measurement instrument used (Diaz Olvera et al., 2008). In short, transport affordability cannot be assessed by looking at observed or actual expenditures only, as it is impossible to separate cause from effect. However, comparative assessments of expenditure data, especially when supplemented by other objective data (such as modes used and trip frequencies) and subjective data (such as perceptions of affordability), can provide useful insights into consumption behavior and priority areas for action.

3.5.2 Carruthers affordability model

Most studies on poverty and transport estimate the percentage of monthly income or expenditure devoted to transport by poor families and compare this figure to a benchmark considered affordable to households. The concept of affordability used here is based on the ability to undertake transport movements without significantly constraining the ability to undertake other activities of importance. Given that subsidies are usually justified based on the premise that they increase affordability of low income segments of the population, it is convenient to define the concept of affordability and how it can be used in practice. Operationally, they use the percentage of monthly per capita income or per capita income of the lowest quintile of the income distribution in a city needed to make sixty 10 km trips per month. Formally, affordability indices are define as,

$$Aff_1 = \frac{\sum_{i=1}^{N} \overline{x_i} p}{y} \tag{3.1}$$

where $\overline{x}_i$ is the number of trips –usually public transport trips or work related trips–

taken during the month by household member *i*, and *y* is household income or expenditure. *N* and *p* is number of family members and fares, respectively. One of the advantages of using the methodology proposed by Carruthers is that it makes it easier to estimate comparable affordability indices across cities and countries.

There are two possible applications for the affordability indices developed by Carruthers, et al. First, as an indicator to determine whether urban public transport is too expensive in a given city and therefore that something's should be done about it. A second possible use of the affordability indices is to evaluate the results of certain policy interventions like fare subsidy in both Palembang and Jogjakarta cities. Because the bus subsidies is a percent of fares, the share of each subsidy going to income group *i* equal the share of income group *i*'s expenditure on bus in total expenditure on bus and is thus independent of the percent of fare that is subsidized. Formally,

$$S_{ij} = \frac{x_{ij}.n_i}{\sum_i x_{ij}.n_i} \tag{3.2}$$

where S_{ij} is the share of total subsidy accruing to income group i from travel mode *j*, x_{ij} is the average monthly expenditure by a household belonging to income group *i* for travel mode j and n_i = fraction of households in income group *i*.

Since the beginning of operation new urban bus in Palembang and Jogjakarta is subsidized. Subsidies to public transport are common in developing countries, and are often justified on the grounds that they make transport affordable, rather than on efficiency grounds. Given this justification, it is of interest to know how the benefits from transport subsidies are distributed. The data for this analysis are from the household travel survey (Statistics Indonesia, 2012), conducted in 2010 using home interview surveys of 6,420 households of both cities.

3.6 CUSTOMER SATISFACTION INDEX

A customer satisfaction index is a theoretically robust weighted satisfaction measure for benchmarking and tracking customer satisfaction over time. The concept of customer satisfaction as a measure of perceived service quality was mostly introduced in market research. In this field, many customer satisfaction techniques have been developed. The best known and most widely applied technique is ServQual method, proposed by Parasuraman et al. (1985). The ServQual method introduced the concept of

customer satisfaction as a function of customer expectations (what customers expect from the service) and perceptions (what customers receive). The method was developed to assess customer perceptions of service quality in retail and service organizations. In the method, five service quality dimensions and twenty two items for measuring service quality are defined. Service quality dimensions are tangibles, reliability, responsiveness, assurance, and empathy. The method is in the form of a questionnaire that uses a Likert scale on the seven levels of agreement/disagreement (from strongly disagree to strongly agree).

Some variations of this method were introduced in subsequent years. For example, Cronin and Taylor (1994) introduced the ServPerf method, and Teas (1993) proposed a model named Normed Quality (NQ).

3.6.1 National and international indices

A number of both national and international indices also based on customer perceptions and expectations have been introduced in the last decade. For the most part, these satisfaction indices are embedded within a system of cause and effect relationships or satisfaction models. The models also contain latent or unobservable variables and provide a reliable satisfaction index (Johnson et al., 2001). The Swedish Customer Satisfaction Barometer (SCSB) was established in 1989 and is the first national customer satisfaction index for domestically purchased and consumed products and services (Fornel, 1992). The American Customer Satisfaction Index (ACSI) was introduced in the fall of 1994 (Fornel et al., 1996). The Norwegian Customer Satisfaction Barometer (NCSB) was introduced in 1996 (Andreassen and Lervik, 1999; Andreassen and Lindestad, 1998). The most recent development among these indices is the European Customer Satisfaction Index (ECSI) (Eklof, 2000).

More recently, an index based on discrete choice models and random utility theory has been introduced. The index, named Service Quality Index (SQI), is calculated by the utility function of a choice alternative representing a service (Hensher and Prioni, 2002). The user makes a choice between the service habitually used and hypothetical services. Hypothetical services are defined through Stated Preferences (SP) techniques by varying the level of quality aspects characterizing the service. Habitual service is described by the user by assigning a value to each service aspect. The design of this type of SP experiments is generally very complex; an example of an SP experimental design was introduced by Eboli and Mazzulla (2008b).

Afterwards, Fu and Xin (2007) introduced Transit Service Indicator (TSI) as an alternative measure for the service quality of a transit system. This indicator

incorporated spatial and temporal variations in travel demand and integrated various measures such as service headway, service hours, route coverage, and travel time components. From extant literature, Choocharukul and Sriroongvikrai (2013) analyzed customer satisfaction of Bangkok mass rapid transit passengers by applied factor analysis and structural equation modeling.

A more direct measure for service quality evaluation is provided by an overall index, often called Customer Satisfaction Index (CSI) (Hill *et al*. 2003). To measure customer satisfaction, different numerical values can be used, generally from 1 to 3, from 1 to 5, from 1 to 7, from 1 to 9, etc. The adopted scale can also have an even number of levels, for example, the traditional numeric scholastic scale composed of points from 1 to 10. CSI methods which is calculated by means of the satisfaction rates expressed by users, weighted on the basis of the importance rates, according to the following formula:

$$CSI = \sum_{k=1}^{N} \left[\bar{S}_k . W_k \right] \tag{3.3}$$

where

$\bar{S}_k$: is the mean of the satisfaction rates expressed by users on the service quality *k* attribute

W_k : (importance weight) is a weight of the *k* attribute, calculated on the basis of the importance rates expressed by the user. Specifically, the importance weight is the ratio between the mean of importance rates expressed by users on the *k* attribute and the sum of the average importance rates of all the service quality attributes:

$$W_k = \frac{\bar{I}_k}{\sum_{k=1}^{N} \bar{I}_k} \tag{3.4}$$

3.6.2 Heterogeneous Customer Satisfaction Index

Ideally, CSI portrays good measure of overall satisfaction because it summarizes the judgments expressed by users in respect of various service attributes in

a single score. Therefore, the more accurate the selection of the attributes is the more accurate the measure of the overall satisfaction will obtain. For this reason, the selected attributes should characterize the service aspects deeply as well as reflect the current serving situations as clear as possible.

However, when all the importance scores are close to a certain value, the importance weights are similar, and then the CSI value is close to the average of all the satisfaction scores. In this eventuality, CSI does not give any additional information compared to the indicator calculated by considering only the satisfaction scores. In addition, the average importance scores result from the rates expressed by a sample of customers, which can be very heterogeneous; the dispersion of the rates can be represented by the variance or the standard deviation from the mean. In the same way, the satisfaction rates can be very heterogeneous among users. These heterogeneities cannot be taken into account in the CSI calculation. To overcome this lack, importance weights can be corrected according to the dispersion of the importance rates from the average value. Analogously, satisfaction scores can be corrected according to the dispersion of the satisfaction rates from the average value. These adjustments have been introduced for calculating a new indicator, named Heterogeneous Customer Satisfaction Index (HCSI). From a mathematical point of view, HCSI is calculated by the following formula:

$$HCSI = \sum_{k=1}^{N} \left[S_k^c . W_k^c \right] \tag{3.5}$$

where,

S_k^c : is the mean of the satisfaction rates expressed by users on the *k* attribute, corrected according to the deviation of the rates from the average value

W_k^c : is the weight of the *k* attribute, calculated on the basis of the importance rates expressed by users, corrected according to the dispersion of the rates from the average value.

Whereas S_k^c is calculated by the following formula:

$$S_k^c = \bar{S}_k \cdot \frac{\dfrac{\bar{S}_k}{\text{var}(S_k)}}{\displaystyle\sum_{k=1}^{N} \frac{\bar{S}_k}{\text{var}(S_k)}} \cdot N \tag{3.6}$$

The adjustment factor is calculated as the mean of the satisfaction rates expressed by users on the k attribute divided by the mean of the average satisfaction rates of all the service quality attributes, weighted on the variance of the satisfaction rates.

Similarly, W_k^c is calculated as the mean of the importance rates expressed by users on the *k* attribute divided by the sum of the average importance rates of all the service quality attributes, weighted on the variance of the importance rates, according to the following formula:

$$W_k^c = \frac{\dfrac{\bar{I}_k}{\text{var}(I_k)}}{\displaystyle\sum_{k=1}^{N} \frac{\bar{I}_k}{\text{var}(I_k)}} \tag{3.7}$$

The introduction of the variance for adjusting the importance and satisfaction rates allows the attributes characterized by more homogeneous user judgments to be considered more significant; to the contrary, the attributes with heterogeneous judgments are considered less significant. Moreover, the mathematical basis of the HCSI formula is demonstrated by assuming that all the customers surveyed gave satisfaction scores of 10 out of 10 for every service characteristic, and the average satisfaction scores would all be 10. When the variance of the satisfaction judgments expressed by the customers tends to zero for all service characteristics, the mean of the satisfaction rates divided by the deviation from the mean of each *k* attribute would tend to the maximum value of 10, and S_k^c would tend to $\overline{S}_k$. Therefore, total customer satisfaction on all their attributes would produce a satisfaction index of 100 percent.

Collected data through questionnaire surveys was analyzed for evaluation of satisfaction level using both CSI and HSCI procedures. The last one is relatively new

methodology for customer satisfaction analysis and its roots can be found in the 1980s. Commonly researchers in the field of marketing is frequently applying this methodology for analysis of data and making inferences.

3.7 STRUCTURAL EQUATION MODELING

Structural equation modeling (SEM) is a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables. It is a methodology for representing, estimating, and testing a theoretical network of (mostly) linear relations between variables and tests hypothesized patterns of directional and non-directional relationships among a set of observed (measured) and unobserved (latent) variables (MacCallum & Austin, 2000). Typically, this theory represents causal processes that generate observations on multiple variables (Bentler, 1988). The term structural equation modeling tells two important aspects of the procedure: (i) that the causal processes under study are represented by a series of a structural equation (i.e. regressions), and (ii) that these structural relations can be modeled pictorially to enable a clear conceptualization of the theory. The hypothesized model can then be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data.

3.7.1 Model specification

Structural equation models provide an efficient and convenient way of describing the latent structure underlying a set of observed variables. These models expressed either diagrammatically (path diagram) or mathematically through a set of equations, and such models explain how the observed and latent variables are related to one another. Generally, a statistical model is postulated based on knowledge of the related theory, on empirical research, or on some combination of both. Once the model is specified, plausibility of model is tested based on sample data that comprise all observed variables in the model. The primary task in this model-testing is to find the goodness-of-fit between the hypothesized model and the sample data. Generally, the structure of a hypothesized model imposes on the sample data, and then tests how well the observed data fit this restricted structure. It is very difficult to get a perfect fit between the observed data and the hypothesized model, therefore there will necessarily be a difference between the two and this difference is termed as residual (Byrne, 2010).

3.7.2 Goodness-of-fit of SEM model

The reliability of a SEM model is checked by indices of goodness-of-fit parameters. Following parameters were used in this study in order check the goodness-of-fit of model, i.e. chi-square/degree of freedom (χ^2/DF), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Comparative Fit Index (CFI), Root Mean square Residual (RMR) and Root Mean Square Error of Approximation (RMSEA). Different researchers in the field of statistics have recommended permissible values for these parameters of goodness of fit. As the ratio of chi-square to the degree of freedom (χ^2/DF) less than 5 indicate a reasonable fit of SEM model (Marsh and Hocevar, 1985), GFI, AGFI, and CFI greater than 0.90 indicate good fit of model (Bentler and Bonett, 1980, Bentler, 1982), RMSEA less than 0.80 shows a good fit (MacCallum *et al*. 1996), RMR less than 0.08 is acceptable (Hu and Bentler, 1999). By comparing the estimated values with recommended ones, a model can be accepted or rejected, and if rejected, then alternative models can be tested that best fit to the hypothesis and collected data.

3.7.3 Various applications in transportation research

It is inevitable various researchers in field of transportation have applied the SEM methodology for evaluating the travel behavior and perception to service quality of urban transportation modes. The earliest and well known application are a joint model developed by Den Boon (1980) of vehicle ownership and usage, and a dynamic model of mode choice behavior and user's attitude (Lyon, 1981). Simultaneous equation models of travel behavior and attitudes by Tardiff (1976) and Dobson *et al*. (1978) that give a full-blown to SEM application in travel behavior.

Moreover, Golob and Hensher (1998) employed SEM to address the dichotomy between an individual's behavior and his or her support for policies that are promoted as benefiting the environment. Levine *et al*. (1999) present two latent variable models that explain financial support for public transport and support for an institutional reform in public transport planning. Jakobsson *et al*. (2000) applied five latent variables to investigate causality among acceptance of road pricing, behavioral intention concerning reductions in car usage, and feelings related to fairness and infringement on personal freedom. Further, Garling *et al*. (2001) examined decision making involving driving choices by using latent variables to test links among attitude towards driving, frequency of choice of driving, and revealed presence of a certain type of decision process. Golob (2001) used a series of joint models of attitude and behavior to explain how both mode choice and attitudes regarding a combined HOV and toll facility differ across the

population.

Bamberg *et al*. (2007, 2011) analyzed the importance of soft policy measures using application of structural equation modeling and joint framework of behavioral theories. Eboli and Mazzula (2007) with the application of SEM measure the customer satisfaction of bus service habitually used by University of Calabria students to reach the campus from the urban area of Cosenza, Italy. Nordfjaern *et al*. (2010) examined the driver attitude, personality variables, and behavior in different geographical areas.

Application of SEM model in a few Indonesian cities among others is conducted by Joewono and Kubota (2005, 2007) that test causal relationship between service quality of paratransit and user satisfaction. One of these studies concluded that even at this era's rapid pace of motorization and the current perceived unacceptable level of service, the community at large still needs the existence of paratransit.

3.8 SUMMARY

This chapter elaborates the various steps of research methodology and characteristics of three study case cities. The described steps included selection of case study cities, data collection methods, analysis and modelling techniques. Detailed discussion over analyses and modelling of survey results is described in next five chapters.

CHAPTER 4

INDICATORS FOR MAKING URBAN PUBLIC TRANSPORT REFORM (CASE STUDIES: JOGJAKARTA AND BANDAR LAMPUNG)

This chapter deals with the measurement of new urban bus service quality through indicators from viewpoints of service providers and transport authorities. The aim of this part is to measure how well the service level of new urban bus is delivered and regulated in medium-sized city of developing countries by focusing mainly on two cities of Indonesia such as Jogjakarta and Bandar Lampung. For measurement of service quality, interview and questionnaire survey was conducted in both cities and the interview sheets for local transport authorities and bus operators are provided in Filed Survey II. As much as twenty main variable of service quality indicators were analyzed in the cross-case analysis methods then the results are compared between selected cities and prevailing international standards.

4.1 BACKGROUND

In the transport sector, especially road transport, Indonesia facing a serious problem such as traffic congestion in large cities, low quality of public transport service, rapid rising of motor cycle usage, and high number of traffic accident. In terms of low quality of service, generally public transport in Indonesia's cities are dominated by para transit with low capacity, the fleet owned personally and many of them owned by the drivers, in other words the drivers also be the operators, and managed by conventional management. Those problems have a relationship one to each other, that then forming a circle. Unreliable of public transport service, causing people with low income that previously a potent user of public transport leave them, and they more choose motor cycle as their new travel mode (**Figures 4-1** and **4-2**). Due to that situations, income of public transport operators badly decrease day by day.

Providing public transports systems and their related infrastructure and promoting non-motorized transport can contribute to GHG mitigation. However, local conditions determine how much transport can be shifted to less energy intensive modes. Occupancy rates and primary energy sources of the transport mode further determine the mitigation impact. The energy requirements for urban transport are strongly influenced by the density and spatial structure of the built environment, as well as by location, extent and nature of transport infrastructure.

The project addresses the key root cause of urban transport un-sustainability: a

dysfunctional transport pricing structure which de facto subsidizes private motor vehicle use by undervaluing scarce public space. Faced with increasing congestion, cities have attempted to increase roads, allocating more space for private motor vehicles. A tragic result has been induced traffic demand, as the low marginal cost of operating a private vehicle leads to choices resulting in increased trip distances.

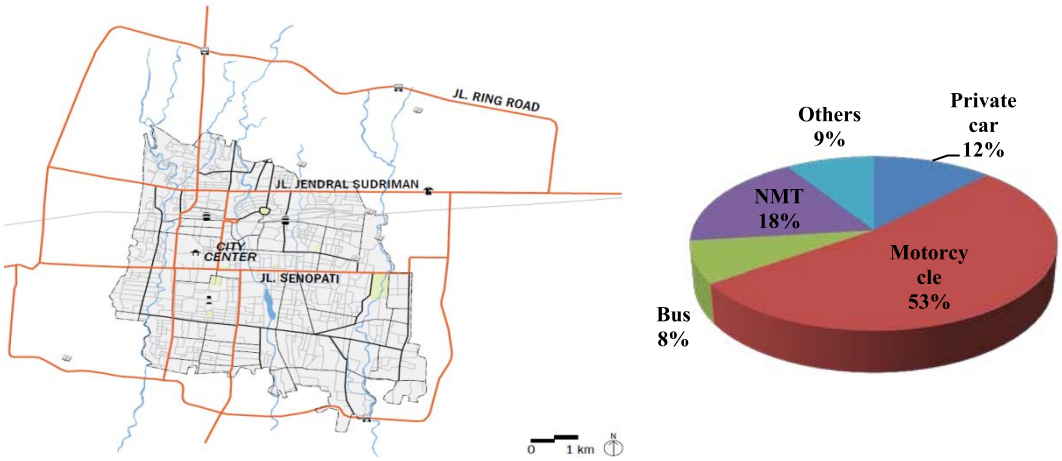


Figure 4-1 City center and transport mode share of Jogjakarta

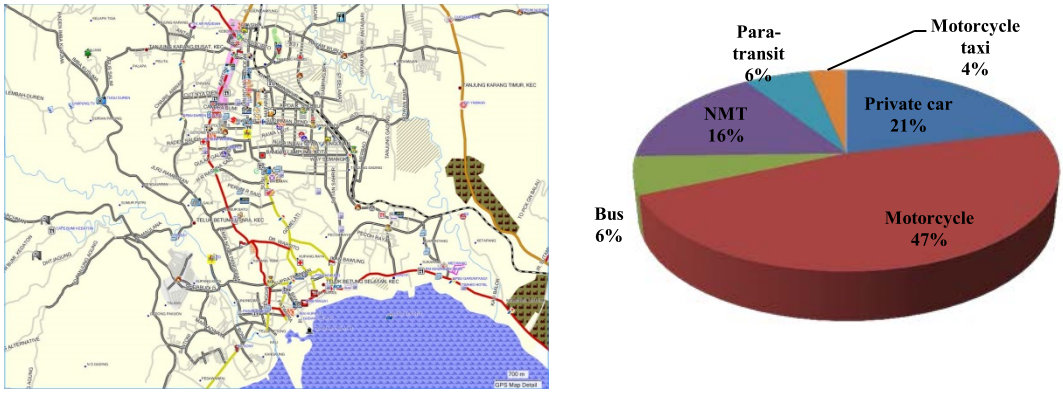


Figure 4-2 City center and transport mode share of Bandar Lampung

The too common result of the road-building cycle is the return of congestion. However, sprawling low-density land-use is resulting in significantly higher energy use than before. The steadily increasing energy use in the transportation sector is likely the single largest threat to long-term reductions in GHG emissions on a global level. The sprawl and returning congestion cycle continue as public transportation steadily declines (**Figure 4-3**). Economic growth provides the first impetus to increase car ownership. More car owners means more people wanting to transfer from public

transport to car; this in turn means fewer public-transport passengers, to which operators may respond by increasing the fares, reducing the frequency (level of service) or both. These measures make the use of the car even more attractive than before and induce more people to buy cars, thus accelerating the vicious circle. After a few cycles (years) car drivers are facing increased levels of congestion; buses are delayed, are becoming increasingly more expensive and running less frequently; the accumulation of sensible individual decisions results in a final state in which almost everybody is worse off than originally (Ortuzar and Willumsen, 2001) .

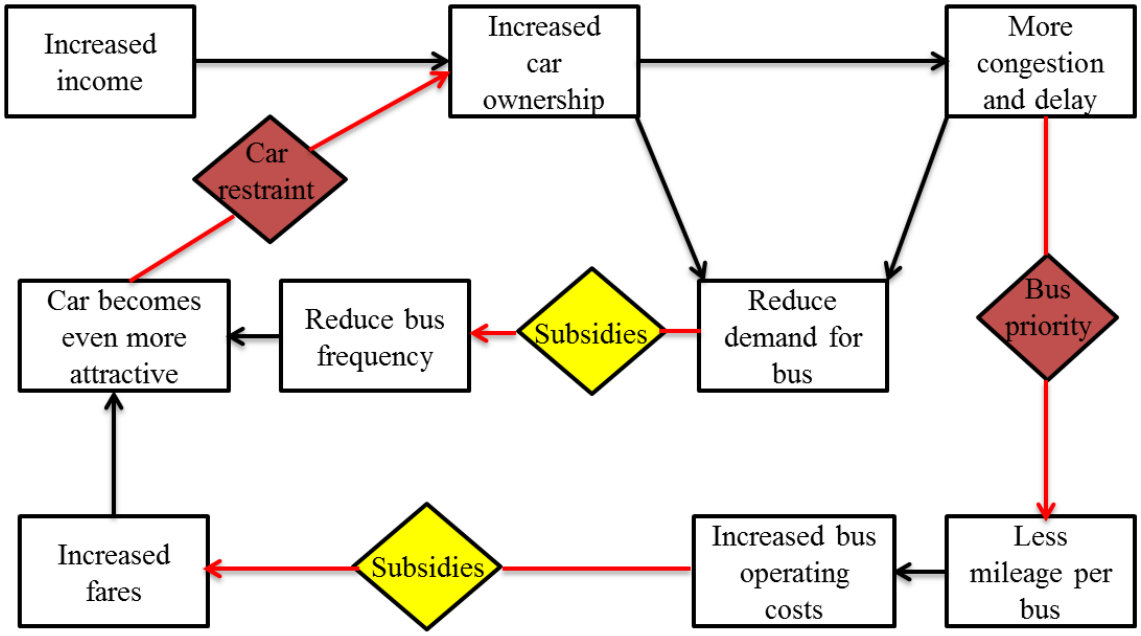
This simple representation as shown in Figure 4-1 can help to identify what can be done to slow down or reverse this vicious circle. For instance, physical measures like bus lanes or other bus-priority schemes are particularly attractive as they also result in a more efficient allocation of road space. Soft measures like public transport subsidies have strong advocates and detractors; they may reduce the need for fare increases, at least in the short term, but tend to generate large deficits and to protect poor management from the consequences of their own inefficiency. Car restraint, and in particular congestion charging, can help to internalize externalities and generate a revenue stream that can be distributed to other areas of need in transportation.

Based on the facts that many cities in Indonesia facing urban transport problems central government through the Ministry of Transportation (MoT) then initiate to promote a smart urban transport system, such system like BRT but more simple, in terms of air conditioned buses, scheduled services, appointed shelters, and smart cart ticketing system.

The first step in implementing the system is MoT signing a memorandum of understanding (MoU) with the local government in order to specify their each role in the development of the system. According to this model, MoT provide such number of buses granted to the local government in order to stimulate them to reform their existing conventional urban public transport, and also allocate some amount of budget to provide infrastructure and supporting facility as needed, while the local authorities responsible to develop the shelters, smart card ticketing system, and subsidy for the operational of the system. As an additional, in constructing the shelters some cities applied a Public Private Partnership (PPP) mechanism, where the private company budgeting for the construction of the shelters that designed with advertising space, and a compensation of tax free for a certain periods.

Jogjakarta took the advantage of the program by introducing its new bus system, TransJogja, serving beyond the city border covering Greater Jogjakarta area. Before the reform, bus ridership in Jogjakarta was quite low. The city bus network

consisted of 19 licensed routes of which 16 routes were in operation with 591 fleets. The average load factor of public transport was declining to only 27.22%. On the other hand, the use of private modes is increasing. Motorcycle ownership, in particular, is increasing by 6000–8000 units per month. In 2004, motorcycle was 47.6% of the total daily trips, while bus 27% followed by bicycle (15%) and car (8.2%) (Dirgahayani and Nakamura, 2012).



Source: Adapted from Ortuzar and Willumsen (2001)

Figure 4-3 The cycle of increasing car ownership and declining bus service, with possible interventions

In 2007, Jogjakarta city established MoU with the provincial government of Jogjakarta regulating the cooperation scheme between the two parties. Under this MoU, the provincial government provided 20 units of bus funded by MoT, 42 shelters outside city, 76 units of Smart Mass Transit Solution (SMTS) ticketing system, and information or direction signs at every shelter. On the other hand, the city built 34 shelters within its administrative area. Some shelters were financed through advertisement in some public–private partnership schemes. Provincial government further established a contractual agreement with operators regarding five-year rent and other service standards. The rent fee paid by the operators will be used to cover the cost of renewing the fleet after five years.

While a different steps being taken by the Bandar Lampung government to

promote sustainable urban transport. City mayor directly received the proposal format of private company for provide transportation services within the city even without any implicit government subsidy. Since officially introduced to the public by the city mayor on 26 September of 2011, new urban bus called TransBandarLampung is running through memorandum of understanding between city government as regulator and a consortium as operator. Starting with only 40 buses (purchased purely consortium) and served two corridors TransBandarLampung until mid of 2012 has 250 buses and serving seven corridors. However, with less than five years in operation, fewer than 50 buses operated on three most profitable corridors around the city.

4.2 INSTITUTIONAL AND ORGANISATIONAL FRAMEWORKS FOR THE PUBLIC TRANSPORT

The existing institutional form of public transport operations in Indonesia is quite simple. There are only two main institution involved, which are local transportation office, and cooperation or association of public transport operators. City and regency is a local level of government beneath that of a provincial level. However, they enjoy greater decentralization of affairs than the provincial body, such as provision of public schools and urban public transport services.

Jogjakarta Special Region and four other provinces have special status include in administering and managing urban public transport. The roles and responsibilities of local transportation office are to issue route license and control the public transport services. Cooperation or associations of public transport operators are required only operate on the route based on the number of licenses issued. There is no responsibility to provide any particular level of service or be maintained at minimum level.

When the number of cooperation and operators in a market increases in line to growing needs for service network, they are coordinated into the Land Transportation Organization (ORGANDA) to facilitate communication between local government and operator to succeed for the individual, and as a group. In daily operations, bus operates on fixed routes, with some different bus associations operating buses on the same routes. This competing situation, in addition to the lack of any effective route planning and the failure of the licensing system to impose any service requirements on operators have contributed to decreasing quality of services in the public transport (**Figure 4-4**).

In the Indonesian view, government's role in urban transport management is largely insignificant due to institutional weakness in both provincial and city government tiers. In nearly all countries, including decentralized federal systems,

certain policy decisions affecting urban transport are made at the central government level, such as the level and structure of vehicle and fuel taxes and vehicle emission standards (World Bank, 1999). In many countries, the capital city is accorded special status within the national urban system, with a degree of political and fiscal autonomy in urban transport and other sectors that is not enjoyed by other cities. Examples include Seoul, Bogota, and Jakarta, which are national capital districts with both city and provincial powers. In China, a number of cities have provincial status (Bahl and Linn, 1992).

On the one hand, decentralization offers a number of advantages over centralization, e.g., enabling objectives and conditions to be shaped by local conditions and preferences, improving responsiveness and accountability to system users, and promoting experimentation with innovative approaches to urban transport problems (World Bank, 1998). On the other hand there may be weaknesses with decentralized approaches, e.g., where decentralized decisions result in spillover effects across jurisdictional boundaries, raise issues related to scale economies, or raise issues related to inter-jurisdictional trade; decisions related to the level and structure of vehicle and fuel taxes and vehicle emission standards would all fall in this category and hence are taken at the national level in most countries.

While dramatic change was brought about by the enactment of Law No 22 of 1999 on Regional Government Administration and Law No 25 of 1999 on the Fiscal Balance between the Central and Regional Governments. Indonesia's local governments can function autonomously except for defense and security, foreign policy, monetary and fiscal policies, judicial affairs and religious affairs. Responsibilities of cities and regencies extend to most aspects of urban transport, with the exception of most forms of taxation (including vehicle taxation), fuel pricing and specifications, and type approvals. In practice, however, even metropolitan cities like Jakarta, Surabaya and Bandung, do not have the institutional capacity to develop their own inspection and maintenance regimes, public transport regulation and licensing systems, or even bus stop standards.

City governments are working to manage public transport systems in a way that is environmentally sustainable and meets the needs of people and the urban economy. However, migration to cities easily overwhelms public systems because more people mean more demand for transportation. When automobile ownership is also high, migration contributes to increased congestion and pollution - as is the case in Jakarta, Surabaya and Bandung.

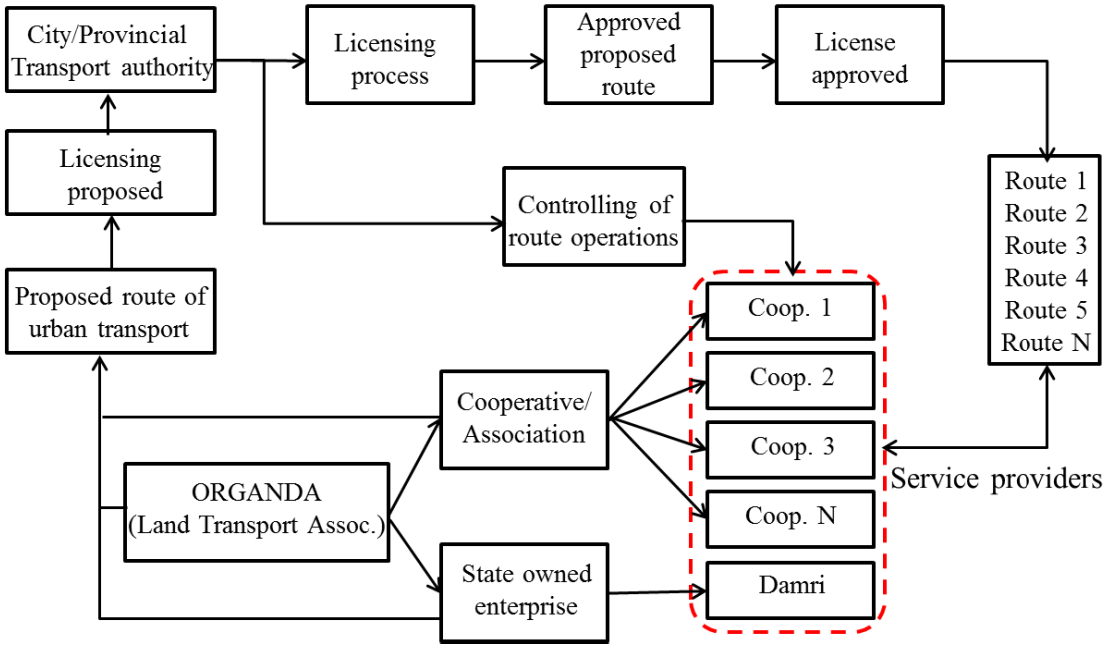


Figure 4-4 Institutional and organizational frameworks for the public transport

4.2.1 Launching new urban buses-TransJogja

Though the lack of support infrastructure (e.g., paths, bus stops, dedicated lanes, terminals) TransJogja started its operation in February 2008, operated by Jogja Tugu Trans, Ltd. There are 54 buses, more than 70 bus shelters, with four different routes. TransJogja operates from 5:30 am until 9:30 pm. Ticket costs on TransJogja are trip based. Passengers pay for one trip and can go any distance along the bus route. Changing buses is free as long as it is done within one hour from the start of the first trip.

The development of new urban public transport is quite satisfied during the first few months. The survey made on this public transport showed that the average of bus load factor has reached 30%, a big increase than when it was launched, which was only about 20%. In addition, interviews done with passengers revealed only 21% of passengers were passengers who also use other public transport, while 59% alternatingly use motorbikes and 8% drive cars. Those who drive a car occasionally also use TransJogja. They are satisfied in terms of security and safety (Pustral, 2010). Operating income is exceeded the target from 15 billion to 15.3 billion rupiah in 2009.

Although getting positive response from the community, the result of a next survey conducted by provincial transportation office of Jogjakarta shows that there is dissatisfaction of passengers on the TransJogja services, particularly waiting time

(timeliness and schedule) and travel time. The results revealed that only 27% of respondents who felt the bus service in terms of waiting time was good, while 20% said enough, and the remaining 55% stated less good, while for the travel time some 47% said less good, 11% said good enough, and 42 percent said good (Jogjakarta Provincial Government, 2011). According to local expert, the bureaucracy becomes an obstacle, in addition to the lack of awareness in public transport priority makes urban public transport set aside.

4.2.2 Launching new urban buses-TransBandarLampung

Formally launched the new urban bus service on December 19, 2011, a consortium which consists of such private bus operators starting with 40 fleets and served two corridors. According to memorandum of understanding with city government, authorities provide public transport infrastructure such as paths, bus stops, and terminals as well as the consortium is responsible for operation commercial services according to the specified frequency. Different from the others, TransBandarlampung payment systems are still using conventional methods that pay on the bus to the conductor and bus service runs on a commercial basis with no subsidy from city government. The Bandar Lampung chapter of the ORGANDA has targeted that the public minivans in the city would be phased out by 2015, as part of a precondition to implement mass transportation in the city. ORGANDA data shows 2,800 minivans operated in the city in 2009, and in the middle of 2010, the number had decreased to 1,700. Despite being equipped with air-conditioners and offering a better service compared to conventional buses and public minivans, bus fare is set be the same at around Rp 3,000 (about 30 US cents) a trip. In June of 2012 the consortium operates more than 200 fleets in the city of almost one million.

New urban bus service got positive response from urban dwellers. However, inadequate management continues to cause declines in the quality of service. Moreover, the size of its fleet was falling down to only 50 units by the end of 2014. Some of the identifiable causes of their failure include financial impropriety, a weak local transport authority and perhaps no effective authority planning. Recently, a single operator only serves the most profitable routes, operates during peak hours only that allows riders to use the service to take them to their destination and back. In cities where government plays only a limited role in the provision of public transport services, certain routes may have excess service, resulting in dysfunctional competition, while other routes may lack service entirely. Governments, therefore, need to step in to make services available to all, by regulation and, if necessary, by offering to subsidize them (World Bank, 2013).

4.3 COMPARISON OF PERFORMANCE INDICATORS

In this section, current service provider capabilities and transport authority on general functions are compared between case study cities to figure out the performance level in responding proposal of Ministry of Transportation. As mentioned in previous chapter, both questionnaires and interviews were used to gain insight into how they apply delivery of services, and how ongoing status is and improvement needs. Furthermore, Urban Bus Toolkit (World Bank, 2011) reviews the most common problems affecting bus systems along with performance measures designed to measure the extent of these problems. They provide a series of benchmarks and indicators relating to best practices in developing countries. Comparing these figures with actual figures for city will indicate the extent of it problems and help transport authorities and key stakeholders determine what factors are causing them.

4.3.1 The range of service provider capabilities

It is inevitable urban bus systems in developing cities face many problems. Some are serious, some less so. Some problems appear to be more serious than they are. Conversely, an existing problem may not even be recognized, particularly in cities where local government entities include provincial, regencies and cities play only a limited role in the provision of urban public transport services.

Operating practices can have a significant impact on operating costs, and hence profitability, fare levels, service capacity, reliability and frequency. Moreover, scheduling procedures are particularly significant. If bus services are operating on schedules, which are designed to ensure that service frequencies are commensurate with demand at different times, services can be operated with a minimum of excess capacity, thus maximizing revenue per kilometer. Sophisticated scheduling techniques can maximize bus utilization, by deploying a bus on more than one route during the course of the day.

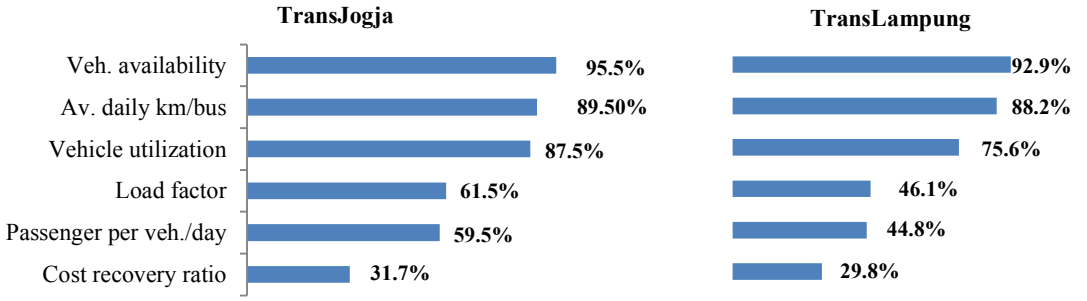


Figure 4-5 Comparison of key performance indicators- a compare against standard level

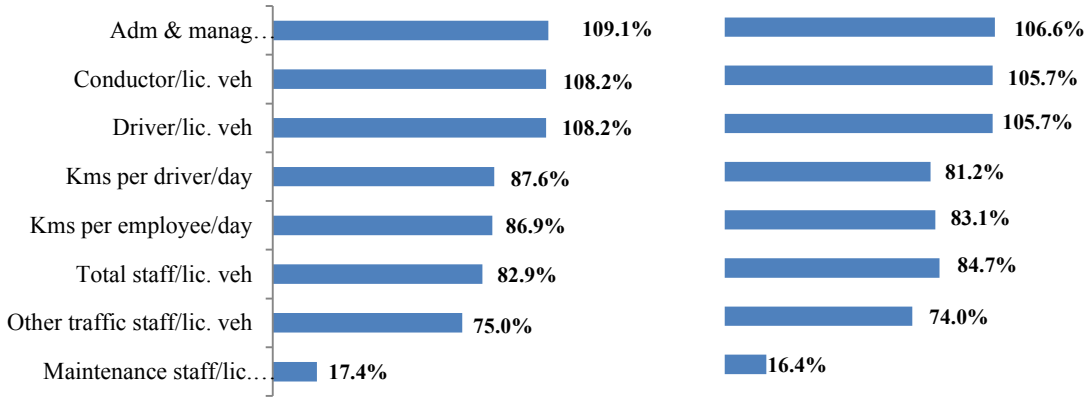


Figure 4-6 Comparison of staff productivity- number of employees compared to standard employees, %

In certain circumstances, particularly with routes operating at low frequencies, this can significantly reduce idle time (World Bank, 2011). A major problem with a scheduled operation, however, is difficulty in adhering to schedules when there are frequent and significant, but unpredictable, delays caused by traffic conditions. Figure 4-3 and 4-4 illustrate the several of service provider capabilities in the case study cities. The performance indicator measures selected should be familiar to public transport planners that can be used to identify how it bus system may be out of line with other cities and how it compares to best practices elsewhere. The figures represent the percentage of performance indicators against a standard or expected level of performance. Service providers have a low cost recovery ratio, as many public transport operators in developing countries (**Figure 4-5**). Weak profitability is often a major problem that can leads to loss of income and inadequate funds to sustain the operation. Further, load factors are slightly low: 61.6% average in Jogjakarta and 46.1% average in Bandar Lampung indicated new urban buses less attractive than other modes of transport.

In terms of staff productivity indicators the staff-per-vehicle ratio is a useful measure of the effective use of staff particularly when making comparisons between different operators. Not surprisingly number of personnel working in buses per total number of buses in both case study cities is excessive particularly in most of developing countries where wage levels are low and therefore many tasks may be undertaken using more labor-intensive methods (**Figure-4-6**). The fact clearly shows that private operators of urban buses are unable to complete their service performance for which they have been contracted.

4.3.2 The range of transport authority on general functions

The first form involves government primarily discharging its regulatory role of ensuring that services are safe and affordable, while in the second, it takes on a more active role, by determining the kind of public transport service that should be available and contracting for such services, including through subsidies if necessary. **Figures 4-7** to **4-9** illustrate the range of functions exercised by local governments; in Jogjakarta at the provincial level, while in Bandar Lampung at city level. TransJogja urban buses are available from 6:00 a.m. to 21:00 p.m. or level C, while TransLampung urban buses are only available from 6:00 a.m. to 18:00 p.m. or level D. Average speed range from 15 to 16 km/hour or level C due to weather and traffic conditions. Furthermore, travel time would be unpredictable and urban bus service is less reliable.

Irregular and unpredictable service frequencies make a bus service less attractive. Based on results as shown in **Figure 4-8**, frequency varies but on average a bus comes every 43 (TransJogja) to 49 minutes (TransLampung).

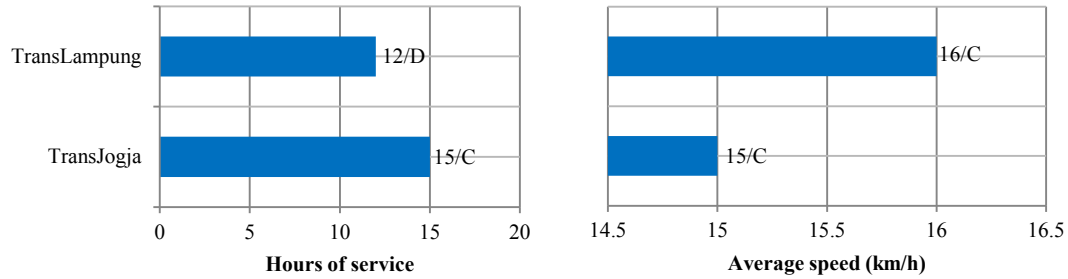


Figure 4-7 Hours of service and speed-a comparison between existing figures and standards levels

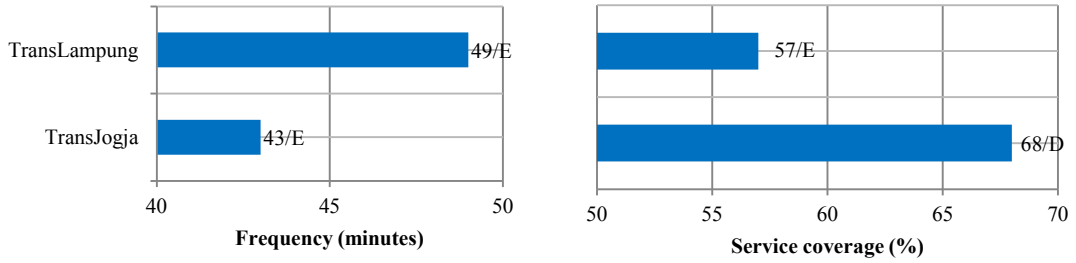


Figure 4-8 Frequency and service coverage-a comparison between existing figures and standards levels

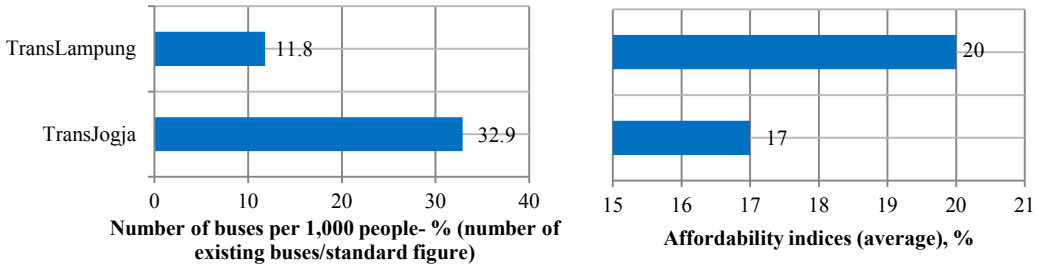


Figure 4-9 Comparison of number of buses and affordability

In urban area, a walk of 500 meters or less to or from nearest bus stop is normally regarded as desirable, while a distance greater than this is regarded as inconvenient. An acceptable range for a typical city in a developing country is between 75% and 90%, although to some extent what is achievable is influenced by the road system. Based on analysis results, the average percentages of urban area within 500 meters of urban stop is 68% (TransJogja) and 57% (TransLampung), indicate service coverage within the city is poor or substandard. Moreover, number of buses per 1,000 people in Jogjakarta and Bandar Lampung is low enough compared to standard: by compared with normal standard the figures are 32.9% and 11.8%, respectively (**Figure 4-9**). An appropriate fares policy is essential to sustain affordable services that meet demand, while providing the operator with an adequate return on investment. An affordability index could be defined as the fare expenditure as a percentage of income. In developing countries, a reasonable level of household expenditure on bus travel should not exceed 10 percent of household income, while in developed countries, households without cars may spend in the region of 3-5 percent of their incomes on commuting (Carruthers, 2005). However, affordability indices in both case study cities are also quite high. They are 17% (Jogja) and 20% (Lampung), respectively, or two times higher than standard (**Figure 4-9**).

4.4 SUMMARY OF FINDINGS

The results showed that indicators performance of TransJogja is slightly better than TransLampung, however, most indicators performance are inadequate in providing services. Staff productivity as a key indicator of overall operator efficiency in terms of output per employee is low compared to figure standards indicates the excess number of staff. Excess staffing would cause unnecessary expenses as well as excessive administrative costs. In terms of transport authority on general functions, it can be concluded that there is little or no coordination among them to developing an integrated and comprehensive urban transport system.

CHAPTER 5

COMPARISON OF AFFORDABILITY INDICES AND URBAN BUS SUBSIDIES IN MEDIUM-SIZED CITY (CASE STUDIES: JOGJAKARTA AND PALEMBANG)

This chapter presents affordability and subsidies in urban public transport: an international comparison of local transport subsidies. This chapter explores the relationship between institutional arrangements for public transport and operating subsidies for public transport. It is inevitable that there is a particular focus on the aims behind urban public transport development project, what this means for fare levels, and how any necessary subsidies are funded. There is a common theme that, to be effective, transport and environmental policies require affordable fares; yet this is in conflict with fiscal policies seeking to reduce public spending. In order to make new urban bus affordable, local governments subsidize new urban bus fares, rather than on efficiency grounds. Although there are many pros and cons of transport subsidies, it is of importance to evaluate how the benefits from transport subsidies are distributed and how should be.

5.1 BACKGROUND

In considering whether or not to grant a fare increase application, many authorities take into consideration a measure of affordability. There is unfortunately no internationally agreed method of measuring affordability when applied to bus services. However the normal approach is to divide the price of a number of standard journeys by some measure of income. While conceptually this is a simple measure, it is not easy to measure either parameter. The cost of a journey can vary significantly depending on the distance travelled and whether monthly passes are used or not. Equally, income is also difficult to measure on a standard basis (World Bank, 2011).

Unless there is reason to select a specific journey, it is probably best to take the average fare paid by all passengers as the measure of the fare, and either the average income of all groups or the GDP per capita if available. The figures are usually compared on a monthly basis, and therefore the cost of a standard number of trips, e.g. 50 per month, is usually compared with the average monthly wage. This measure is most useful when used to compare a fare/income ratio in a particular city over a period of time as incomes change. In the case of Carruthers, Dick and Saurkar (2005) are 60 trips per month for each person.

5.1.1 Travel pattern in Jogjakarta

Greater Jogjakarta, one of the focuses of case study city, constitutes the core of the Jogjakarta metropolitan region. Greater Jogjakarta, with a population of 2.4 million people in 2014, is one of the most densely populated cities in terms of medium-sized city in Indonesia. In recent years, the city faces enormous challenges with shortages of land, housing, infrastructure, and social services that have not kept up with the growing demands of the city, mainly triggered by rapids development tourism industry. Meantime, with very limited natural resources, the Jogjakarta economy is largely dependent on education and tourism industry.

Mumbai's urban public transport system consists of a new urban bus system and conventional public bus system, as well as tourist buses, private taxis, motorcycle taxis and auto rickshaws. The new urban bus called TransJogja carries over 16,000 passengers every day and the conventional bus carries less than 10,000 passengers every day. TransJogja operated by single private operator Jogja Tugu Trans Ltd., based on a five years contract, whereas the conventional operators operate the route under license system. Currently fewer than 300 buses operated on about 21 fixed bus routes around the city.

In order to better understand travel patterns, Ministry of Transport conducted a survey of 2,830 randomly sampled households in the metropolitan Jogjakarta region in the mid of 2012. A questionnaire was administered to each household, and travel diaries were completed by the head of household, a randomly chosen adult over 17, and a randomly chosen household member between 17 and 25.The goal of the survey was to characterize the travel patterns of poor and no poor households, to estimate the time and money costs of travel and to evaluate the impact of various government policies including transport.

In Jogjakarta metropolitan region, as in other cities in Indonesia, the journey to work constitutes the largest fraction of household trips in terms of destination of traveler. **Table 5-1** describes the main mode used on a typical commute trip. In this term, the main mode is defined to be the mode that takes the longest time in the working week. Table 5-1 indicates that more than 51% of commuters ride a private motorcycle to work, 12% rely on private car as their main mode, and 10% walk to work as a main mode. The modal shares for TransJogja and conventional bus are much smaller: they are 5.7% and 2.1%, respectively, indicating urban bus is currently losing its market share. Data is also showed that commuters who take motorized transport to work, 73% take either private vehicle or urban bus or taxi. In the contrary, only about 18% of commuter trips are made by non-motorized transport.

Furthermore, the respective modal shares are somewhat different for the poorest income group in the survey, defined as households with a monthly income below Rp.< 0.5 M: 58% of the workers in these households using private motorcycle to work, 16% walk to work as main mode, 4% ride a bicycle, and 8% ride the bus. However, of those workers who use motorized transport, 69% take either private vehicle or urban bus. Moreover, a greater proportion of commuter trip is made on motorcycle modes, reflecting the greater number of commuting trips made in the working week.

Table 5-1 Main mode to work-Jogjakarta

Main transport mode	Percentage of all households	Percentage of households with income <Rp. 0.5 M
Private car	12.2	0.0
TransJogja	5.7	4.6
Bus-conventional	2.1	3.8
Motorcycle	51.6	58.1
Taxi motorcycle	1.5	1.7
Taxi	0.3	0.1
On foot	10.2	16.3
Bicycle	4.1	3.7
Pedicab	3.6	1.2
Others	8.7	9.5
Sample size	2,830	511

5.1.2 Travel pattern in Palembang

Similar to other cities in developing countries, Palembang has a relative great number of household members in families. Based on household survey, the average number is 6 consists of father, mother and children. About 64% of Palembang's people is working age population (25 to 55) and may affect the amount of commuting within the city to and from workplace. The predominant pattern of urban land use is for commercial premises to line the main road network, with residential areas being located behind these premises. Table 5-2 shows the main mode used on a typical commute trip in Palembang. **Table 5-2** indicates that more than 34% of commuters ride a para-transit to work, 33% rely on private motorcycle as their main mode, and less than 4% walk to work as a main mode. Of the total commuter trips, around 82% are made by motorized transport modes, and around 11% are made by non-motorized modes.

Table 5-2 Main mode to work-Palembang

Main transport mode	Percentage of all households	Percentage of households with income <Rp. 0.5 M
Private car	6.7	0.0
TransMusi	2.7	3.4
Bus-conventional	1.2	4.8
Para-transit	34.6	39.4
Water bus	0.5	0.7
Motorcycle	33.3	41.2
Taxi motorcycle	1.1	0.3
Taxi	2.1	0.1
On foot	3.6	3.9
Bicycle	1.7	0.5
Pedicab	5.4	2.1
Others	7.1	3.4
Sample size	3,590	627

Additionally, the respective modal shares are slightly different for the poorest household group in the survey, where 41% of the workers in these households ride a private motorcycle to work followed by 39% ride a para-transit to work as main mode. Further, 8% of workers in these groups ride the bus, and 4% walk to work as main mode. However, of those workers who use motorized transport, 90% take either private vehicle or para-transit or urban bus.

5.2 AFFORDABILITY OF TRANSPORT

5.2.1 Household expenditure on transport

The fact shows that even work trips are made on foot does not imply that expenditures on transport are low, even for households where the primary earner walks to work. In poor households where the principal wage earner walks to work, 11% and 12% of family income in Jogjakarta and Palembang is spent on transport, respectively.. In both case study cities, the figure is even higher in households where the main earner takes the non-motorized transport or bus or motorcycle to work: in Jogjakarta's households where the main earner takes the non-motorized transport to work 14% of household income is spent on transportation; the percent spent on transport is 17.5% and 19%, respectively, for households where the main earner takes the bus and motorcycle to work (**Table 5-3**). The figures are slightly different for Palembang's

households where the main earner takes the non-motorized transport to work, 12.5% of household income is spent on transportation; the percent spent on transport is 18.5% and 16.5%, respectively, for households where the main earner takes the bus and motorcycle to work (**Table 5-4**). These figures clearly indicate that expenditure on transport between bus and motorcycle is almost the same in both case study cities. Additionally, the wealthier households of Jogjakarta and Palembang where the main earner takes the car to work 18.5% and 21%, respectively, of household income is spent on transportation; the percent spent on transport is 9.5% and 11%, respectively, for these households where the main earner takes the bus to work.

Table 5-3 Percent of household expenditure on transportation by income group and commute mode of principal earner -Jogjakarta

	Walk	NMT	Bus	Motorcycle	Car
<0.5M	11.0	14.0	17.5	19.0	-
0.5-1.0M	10.0	12.5	18.0	18.5	-
1.0-2.5M	8.0	13.5	15.5	17.0	-
2.5-5.0M	5.0	9.0	9.5	14.0	18.5
>5.0	6.0	5.0	6.0	9.0	17.0

Table 5-4 Percent of household expenditure on transportation by income group and commute mode of principal earner –Palembang

	Walk	NMT	Bus	Motorcycle	Car
<0.5M	12.0	12.5	18.5	16.5	-
0.5-1.0M	12.0	10.5	18.0	17.5	-
1.0-2.5M	10.0	11.5	14.5	14.5	19.5
2.5-5.0M	8.0	10.0	11.0	15.0	21.0
>5.0	7.5	7.5	8.5	10.5	18.0

Tables 5-5 and **5-6** show mean total household expenditure on transport in case study cities, by category of expenditure. Average household expenditure on Trans buses and para-transits increase with income as do average expenditures on conventional buses until the highest income category, when it decreases slightly. In both case study cities, however, the percent of income spent on public transport is highest for the lowest income group. Referring to Carruthers method the average transport affordability index in Jogjakarta and Palembang is 17% and 20%, respectively. These indices are much

higher compared to other cities of developing countries.

Table 5-5 Mean monthly household expenditure (Rupiah) on transportation and percent of income spent on transport, by income group-Jogjakarta

	<0.5	0.5-1.0	1.0-2.5	2.5-5.0	>5.0
Private car	-	-	-	281,250	750,000
TransJogja	11,250	37,500	61,250	112,500	187,500
Bus-conventional	10,000	15,000	28,000	18,750	37,500
Para-transit	12,500	30,000	52,500	75,000	75,000
Motorcycle	16,250	33,750	54,250	75,000	150,000
Taxi	2,500	7,500	31,500	30,000	127,500
Fuel	7,500	18,750	36,750	45,000	262,500
Vehicle maintenance	2,500	7,500	33,250	37,500	135,000
Total transportation expenditure	62,500	150,000	297,500	675,000	1,725,000
Share of income (TransJogja expenditure)	**4.5 %**	**5.0%**	**3.5%**	**3.0%**	**2.5%**
Share of income (total transport expend)	**25.0%**	**20.0%**	**17.0%**	**18.0%**	**23.0%**

Table 5-6 Mean monthly household expenditure (Rupiah) on transportation and percent of income spent on transport, by income group- Palembang

	<0.5	0.5-1.0	1.0-2.5	2.5-5.0	>5.0
Private car	-	-	52,500	281,250	750,000
TransMusi	13,750	43,500	78,750	120,000	150,000
Bus-conventional	10,000	15,000	35,000	18,750	37,500
Para-transit	12,500	30,000	52,500	45,000	75,000
Motorcycle	16,250	25,500	43,750	41,250	105,000
Taxi	2,500	11,250	21,000	30,000	127,500
Water bus	3,750	9,750	17,500	37,500	75,000
Fuel	6,250	26,250	26,250	45,000	225,000
Vehicle maintenance	2,500	15,000	22,750	37,500	105,000
Total transportation expenditure	67,500	176,250	350,000	656,250	1,650,000
Share of income (TransMusi expenditure)	**5.5 %**	**5.8%**	**4.5%**	**3.2%**	**2.0%**
Share of income (total transport expend)	**27.0%**	**23.5%**	**20.0%**	**17.5%**	**22.0%**

The numbers in **Tables 5-5** and **5-6** indicate some results regarding the incidence of Trans buses subsidies. As long as the transport subsidy is a constant percentage of the fare for all income groups, the subsidy in Rupiah will increase with household expenditure on transport. Hence, transport subsidies in Rupiah will increase with income for Trans buses. In both case study cities, the urban bus subsidy as a percent of income will, unfortunately, be highest for the lower income group, which spends the highest proportion of income on Trans bus. This is clearly indicated in Table 5-5 and 5-6 which show that of all income groups the poor spend the highest percent of their income on TransJogja (5%) and on TransMusi (5.8%).

5.2.2 Fare structure

Urban bus fares in case study cities are regulated by local government and enforcement is often more stringent than for any other regulation. However, the fact indicates that all income households spend more per month on Trans bus than on conventional bus and para-transit reflects the fact that new urban bus fares are higher, per kilometer traveled, than conventional bus and para-transit fares. At the time of field survey, a person commuting each way by Trans bus paid a flat fare of Rp. 3,500 in Jogjakarta and Rp 5,000 in Palembang, with free transfers to the entire system.

Whereas the distance-based is applied to conventional bus and para-transit where fare based on increments of distance with corresponding fare zone boundaries identified for each route. The fact that the middle income households of Jogjakarta spend almost the same per month on para-transit than on motorcycle reflects the fact that para-transit fares are almost the same, per kilometer traveled, than costs of using motorcycles (**Table 5-5**).

The fact is slightly different for Palembang where middle income households spend less per month on motorcycle than on para-transit reflects the fact that costs of using motorcycles are less, per kilometer traveled, than para-transit fares (**Table 5-6**). Moreover, the fact that all but the lowest income households in both case study cities spend more per month on new urban bus than on motorcycle reflects the fact that new urban bus fares are higher, per kilometer traveled, than costs of using motorcycles. These findings are not surprising at all: in fact, both local governments in case study cities intend to improve the supply of public transport services which are still facing many obstacles and barriers that need to be solved. On the other hand motorcycle ownership is growing at very high rate.

5.3 TRANSPORT SUBSIDIES DISTRIBUTION

5.3.1 Supply-side subsidies

With increased economic prosperity, the ownership of private cars and motorcycles in the case study cities has risen rapidly in recent years, with annual increases often exceeding 10%. This has resulted in a continuing rise in the use of private vehicles, leading to increased road congestion, increasing emissions of greenhouse gases, stagnation of the public transport system, and a dramatic reduction in walking and the use of non-motorized modes for travel within the city. To address increasingly transport problems, the Ministry of Transport (MoT) initiated to promote a smart bus-based urban transport system employing features such as air-conditioned busses, scheduled services, designated shelters and a smart card ticketing system. Further, MoT provides busses and coaching during the implementation to prioritized cities to stimulate them to further reform their public transport system. The local government is responsible for the provision of public transport network and provides subsidies to support bus operations. Formally, subsidies can be channeled to transport suppliers (supply side subsidies), or directly to beneficiaries (demand side subsidies). In turn, supply side subsidies can take two forms: infrastructure (or capital) subsidies or subsidies to cover operating costs. In both case study cities, supply side subsidies are selected in order to lower the cost of service to final users by lowering the proportion of costs that must be funded from fares.

5.3.2 Trans buses subsidies

The fact on field survey shows the different level of subsidies received by urban bus passengers in both case study cities. Ride tickets is about 40% below the price of full-fare tickets in Jogjakarta; and about 30% below the price of full-fare tickets in Palembang (**Table 5-7**). Because the new urban bus subsidies are a percent of fares, the share of each subsidy going to income group *i* equal the share of income group *i*'s expenditure on bus in total expenditure on bus and is thus independent of the percent of the fare that is subsidized. Formally,

$$S_{ij} = \frac{x_{ij}.n_i}{\sum_i x_{ij}.n_i} \qquad (1)$$

where S_{ij} is the share of total subsidy accruing to income group *i* from travel mode *j*, x_{ij} is the average monthly expenditure by a household belonging to income group *i* for travel mode *j*, and n_i is the fraction of households in income group *i*. The incidence figures in Table 5-7 thus apply to any level of bus subsidies that are a percent of the

fare.

An equal distribution of subsidy benefits implies that the percentage of subsidy benefit received by an income category equals its share in the population. The results indicated that while the poorest households constitute one-fourth of total households in the sample of Jogjakarta and Palembang, they receive only 5 and 6 percent, respectively, of transit subsidies. The wealthiest households, who constitute 8 and 7 percent in the sample of Jogjakarta and Palembang, receive transit subsidy that are more than three time and more than two times larger than their equal share, respectively, under the uniform distribution of the subsidy across income groups (**Table 5-8** and **Figure 5-1**). Further, the middle income group, earning Rp1,000,000-Rp2,500,000 per month receives subsidy benefits in roughly equal proportion to their share in the population of both cities. The high income group, earning Rp2,500,000-Rp5,000,000 per month receives about one-third subsidy benefits in both case study cities, respectively.

The figures also show the figures also show distribution of transport subsidy in Palembang is slightly better than Jogjakarta where more than a half of subsidy benefits received by the lowest to medium income groups. In contrast, as much as 56% of transport subsidy in Jogjakarta benefiting households who should not be receiving benefit and represent the leakage of resources of the policy to non-deserving households. In Jogjakarta and Palembang the errors of exclusion –who do not receive any benefits– for the poor, are high enough. They are 20% and 21% respectively. This reflects the fact that a large fraction of persons in the lowest income group does not use Trans services in spite of subsidy fares for new urban bus.

Table 5-7 Trans bus subsidies, by income group

Income group	Percent of sample	Monthly average household expenditure (Rp)		Monthly average households subsidy (Rp)	
		TransJogja	TransMusi	TransJogja (36.4%)	TransMusi (28.6%)
<0.5M	24.5/26.3	11,250	13,750	4,095	3,932
500,001-1,000,000	28.3/25.8	37,500	43,500	13,650	12,441
1,000,001-2,500,000	22.4/23.7	61,250	78,750	22,295	22,522
2,500,001-5,000,000	16.6/17.4	112,500	120,000	40,950	34,320
>5M	8.2/6.8	187,500	150,000	68,250	42,900

Table 5-8 Distribution of Trans bus subsidies, by income group

Income group	Percent of sample	Percent of total subsidy benefits		Percent of households who receive subsidy	
		TransJogja	TransMusi	TransJogja	TransMusi
<0.5M	24.5/26.3	4.50	5.62	79.5	78.5
500,001-1,000,000	28.3/25.8	17.36	17.38	85.0	82.5
1,000,001-2,500,000	22.4/23.7	22.44	28.90	86.5	84.5
2,500,001-5,000,000	16.6/17.4	30.55	32.33	85.0	85.7
>5M	8.2/6.8	25.15	15.57	79.5	80.0

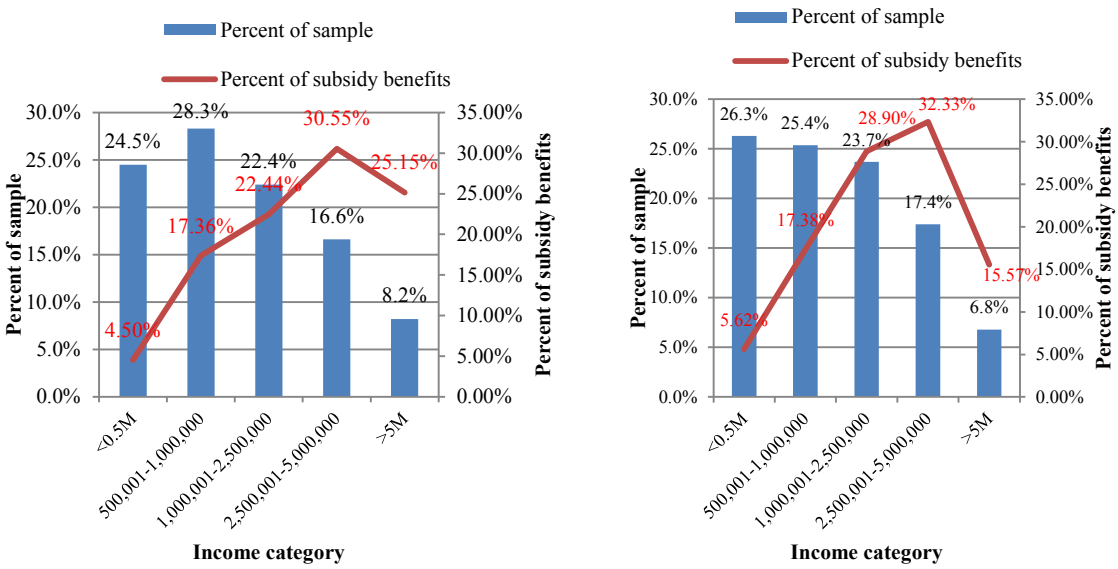


Figure 5-1 Percent of sample and subsidy benefits in Jogjakarta (left) and Palembang

5.4 KEY FINDINGS

Comparison of affordability indices and distribution of transport subsidies in Jogjakarta and Palembang are described in this chapter. In both case study cities, the percent of income spent on public transport is highest for the lowest income group, and the average transport affordability index in Jogjakarta and Palembang is 17% and 20%, respectively. These indices are much higher compared to other cities of developing countries indicate inadequate targeting of subsidies. In Jogjakarta 56% of transport subsidy benefiting households who should not be receiving benefit and represent the leakage of resources of the policy to non-deserving households.

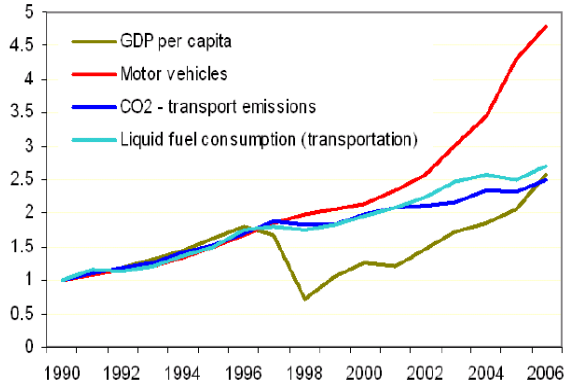
CHAPTER 6

ASSESSMENT OF PUBLIC TRANSPORTATION SYSTEM FROM VIEWPOINT OF SETTING UP NEW AGENCY (CASE STUDIES: JOGJAKARTA AND PALEMBANG)

This chapter deals with the increasingly important issues of roles and responsibilities of transport authorities, with case study cities. Establish of new lead agency is the critical step to address a complicated situation, since existing agencies have failed to play a role in providing an appropriate urban bus services. The aim of this chapter is to investigate an appropriate urban transport institution that can be modifying through retrofitting of existing institutions. Responsibilities for urban transport, however, need to be comprehensively assigned to an established agency (EA) to overcome the problems of lack of coordination and execution. The objective here is to assess what EA models are worthy of adopting and then modify them to the most feasible adjustments of existing institution to demonstrate the effectiveness of this institutional model.

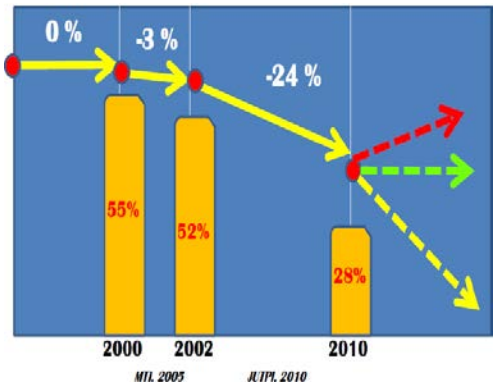
6.1 BACKGROUND

Hitherto the urban public transport systems in large developing cities of Indonesia are facing major challenges due to the continuous growth of urban population, private vehicle ownership, congestion, and the fragility of public transportation systems. During the period of 1990-2006 the number of motor vehicles increased five-fold, despite GDP per capita only growing two and a half times. During the same period, both CO_2 transport emissions and liquid fuel consumption have also increased significantly, though the economic crisis hit Indonesia in 1998, as shown in **Figure 6-1a**. This unusual phenomenon is triggered by several factors, among which, are: (1) the lack of car restriction policy; (2), excessive subsidies on fuel price; (3) the low cost of vehicle ownership including tax and parking; and (4) the decline of urban public transport services. Based on both Indonesian Transport Society/MTI (2005) and JUTPI (2010) data, the share of urban public transport has decreased significantly over the last ten years. As an example, the modal share of public transport still remained at 55 percent in 2000 and then dropped dramatically to only 28 percent in 2010 as shown in **Figure 6-1b**. Traffic congestion and other negative externalities may be worse in the coming years, in conjunction with the launch of low cost green car by the central government in early 2014. This is mainly triggered by motorcyclists who will shift more quickly into car users, with their increasing income.



Source: BPS, 2007 [1]; WRI, 2008; Pertamina, 2008

Figure 6-1a Annual growth rates of GDP per capita motor vehicles, CO_2-transport emissions and liquid fuel consumption in the transport sector in Indonesia



Source: MTI, 2005; JUTPI, 2010

Figure 6-1b Modal share of public transport

Unlike cities in developed countries, most developing cities do not have a proper mass transportation system to suppress the increase of motorization in urban areas. Moreover, the attitude of society is to use automobile ownership as one of the requirements for social acknowledgement. This has encouraged everyone to have their own private car and discouraged them to travel with public transport. In addition, sprawling urban growth with a poor public transport network has also supported the trend of motorization among urban residents in developing cities.

Aiming to tackle the increased motorization in Indonesian cities, particularly motorcycles phenomenon, the Ministry of Transportation (MoT) of Indonesia enacted decree No 51 in 2007, promoting pilot cities for land transport improvement. The decree mandates the pilot city candidates to reflect on their commitments by providing documents declaring their preparedness in terms of institutional capacity, funding capacity, human resource availability and transportation master plan.

The initiatives subsequently gained stronger regulatory support by the enactment of the new Traffic Law No 22 of 2009. This law specifically promotes pro-public transport policy development in the cities. In Article 158, it is explicitly stated that the government must ensure the availability of a land-based mass transit system to meet urban mobility needs. As the implementation of the law, MoT provides technical assistance to promote smart bus-based urban transport systems in order to gradually replace the old buses and restructure the existing bus routes to create a more

efficient city bus network. The MoT funds several fleets, supports some of the infrastructures and local governments are required to allocate resources and subsidies simultaneously to ensure the sustainability of the new transit system's operation. From the target of thirty pilot cities by 2014, to date, twenty seven cities have signed a memorandum of understanding (MoUs) with MoT and launched more than twenty new transit systems, included TransJogja of Jogjakarta and TransMusi of Palembang. Over a few years of operation, however, the roles and responsibilities of transport authority has been no significant changes in urban transport services.

Therefore, the aim of this chapter is to assess the factors that might be affecting on urban bus service performance based on a comparative analysis of roles and responsibilities of transport authority. Data for analysis is collected through interviews and by browsing the websites, then, it is analyzed by using cross-case synthesis with literature review as the consideration. The meetings with local staff of transportation offices and local experts are also conducted to gain a deeper understanding of the function perform of local transport authority.

6.1.1 Outline of Jogjakarta and Palembang

The study areas are the city areas of Jogjakarta and Palembang (**Figure 6-2**). These areas have been chosen because these are the most populated areas and the most rapid growth of transit systems, respectively. They are also of comparable size in terms of transit system operations and data is available for these areas. The total urban area is larger than these city areas, as it stretches out into some of the adjacent regencies. These regencies are much larger than the city area and are largely rural. The size of the area of Jogjakarta City is 32.5 km², while Palembang is a much larger with 358.5 km². Population numbers in 2013 were 510,108 and 1,708,413, respectively, which comes down to densities of respectively 15,695 inhabitants/km² and 4,765 inhabitants/km². For Jogjakarta the actual number of people living in the city area is probably higher as there are many students living in Jogjakarta who are still registered at their parents' address.

The gross regional domestic product per capita shows both cities are much smaller than Jakarta as the capital of Indonesia during the period of 2011 to 2012 (**Figure 6-3**). It is inevitable that the high gap of incomes among regions is the cause of continuing massive urbanization to Jakarta from surroundings provinces, municipalities and regencies in addition to the matter of availability of employment. The Gross Regional Domestic Product (GRDP) or gross domestic product of region is a sub-national gross domestic product for measuring the size of that region's economy. It is the aggregate of gross value added of all resident producer units in the region. The

GRDP includes regional estimates on the three major sectors including their sub-sectors namely:

Figure 6-2 Jogjakarta and Palembang on Indonesia map

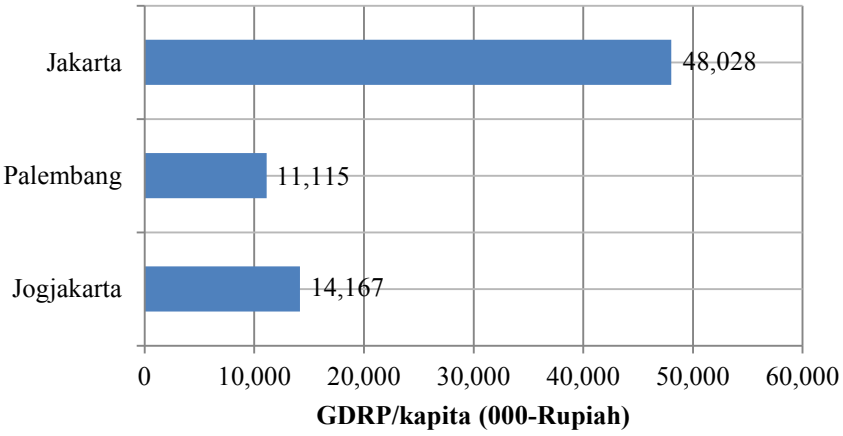


Figure 6-3 GDRP/capita of selected cities and Jakarta

- Agriculture, fishery and forestry (primary)
- Industrial sector, including mining and quarrying, manufacturing, construction, electricity and water (secondary)

- Service sector, including transport, communication and storage, trade, finance, renting and business services and other private services (tertiary).

During 2011-2012, the driving force of cities' economics is totally structured by both secondary and tertiary sectors (**Figure 6-4**); in Jogjakarta the secondary and tertiary sectors contributed with 31% and 68%, respectively, and in Palembang the contribution were 44% and 55%, respectively. The lesser presence of the primary sector means agriculture is no longer attractive to most urban communities.

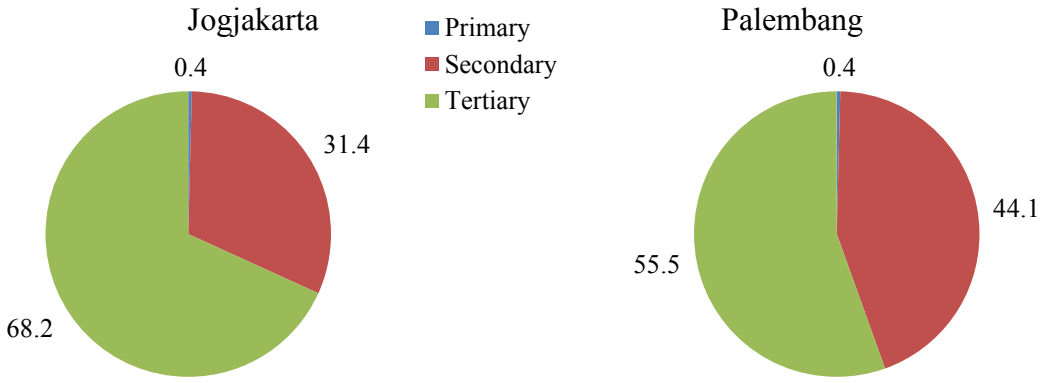


Figure 6-4 Forming of structure economic by sector

6.1.2 New urban bus and organization structure

Both TransJogja and TransMusi are included among the more than twenty of transit system launched until early of 2014 by the MoT. Nothing has changed in terms of the organization of urban public transport in almost all cities, except Jakarta (TransJakarta). It this assumed that a new urban bus system is a routine matter which is run like regular bus or para-transit. In early 2014, or ten years after first launched of new urban bus system, the city has by ordinance created an EA called Transportasi Jakarta Limited, while in other cities the Trans bus is fully controlled by municipal employees. From the organization's point of view, TransJogja trying to superimpose its position on existing structures of the local transportation office rather than a dedicated unit with specific functions (**Figure 6-5**). Typically, some employees are placed in a small unit, called a technical implementation unit. Most of the cities are particularly familiar with the form of organization it was chosen to run new urban bus systems in response to improve service quality.

Palembang city might be a unique case, where the TransMusi is operated

through a company owned by municipal (**Figure 6-6**). The Sarana Pembangunan Palembang Jaya Limited as an operator is responsible for procurement, operation, and maintenance of fleets, while the city government was basically in charge of preparing the infrastructures.

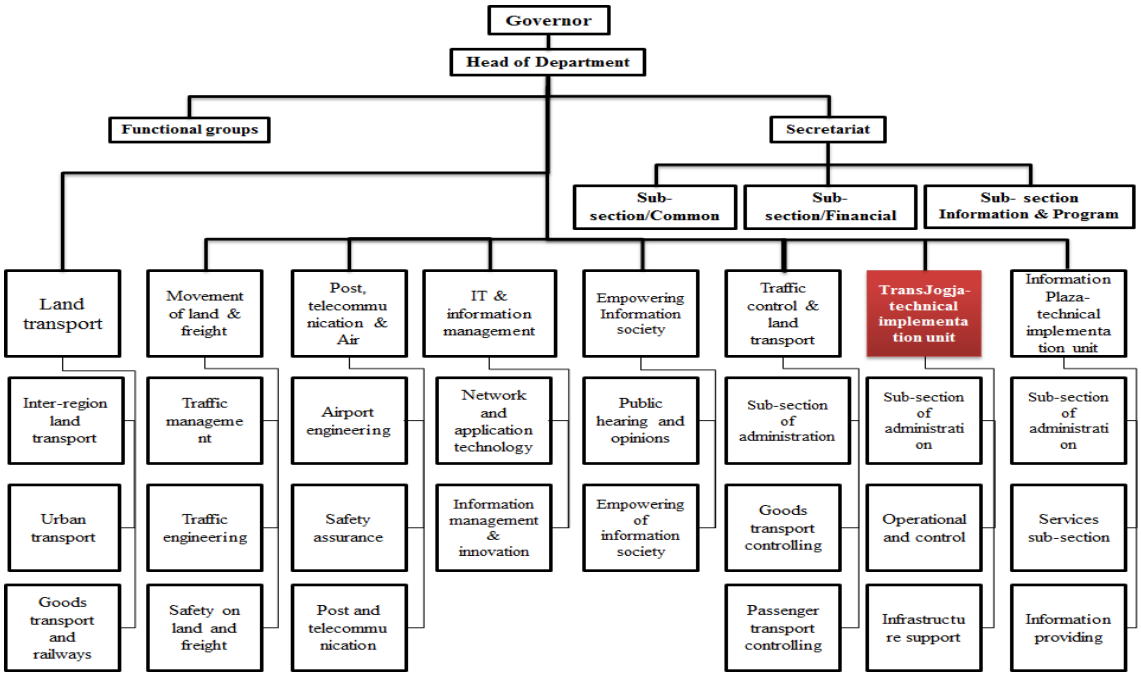


Figure 6-5 Organizational structures of TransJogja

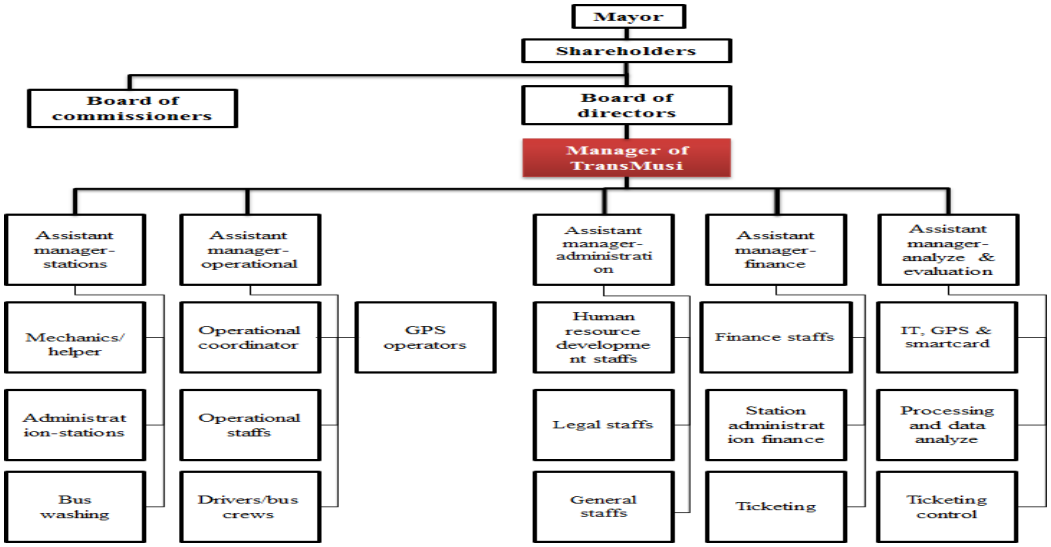


Figure 6-6 Organizational structures of TransMusi

Before being appointed as the managing body of TransMusi in 2010, it was dealing a wide array of business sectors, including public housing, water transport and land developer. Though operated by the company, authorities of managing body are very limited as well as a bus operator is generally. For example, they do not have access to

finance on their own, even to repair a damaged bus, while bus stops, terminals and other supporting infrastructures are handled by other agencies.

Factors including rapid population increase, inadequate and poor service quality of urban public transport, and particularly rapid increase of private motorcycle causes traffic congestion will get worse. However, they did not know about sustainable transport and thus obtained a better sense of what decisions could be made about the transport with greater confidence about the challenges and possible outcomes the intervention would yield. The new urban bus systems, whether run by city authority like TransMusi of Palembang or the private sector as adopted by TransJogja of Jogjakarta, face many economic challenges. Above all, the publicly owned and operated parts of the sector constantly require huge subsidies, while some private operators make a profit. Unfortunately, the bus companies in both cities seem does not have sufficient revenues to maintain their service quality. Allocation and the amount of subsidy itself, involving the local parliament, and is usually determined at the beginning of the fiscal year.

In the meantime, the number of daily passengers of TransMusi continues to decline, due to the low quality service. Long waiting times and the frequency of arrival of a bus as the user desired, cannot be met by the operator. In 2011, the number of passengers recorded 20,000, but in 2013, the numbers decreased to 16,000 people per day. Recently, the number continues to drop to 13,000 passengers per day, as vehicle availability declined. The number of TransJogja users itself tends to fluctuate, but on average, it was recorded as 450,000 per month. For example, in January, February and December of 2012, the number of passengers is 484,743; 452,707 and 468,966, respectively.

Based on both organizational structure and the number of passenger obtained, one thing is clear: establishing a new EA may be critical for implementing strategies, competing or regulating control, provides a legal basis to impose the right mix of obligations and incentives, and to undertake basic network planning, administer regulation and guide the development of the industry. In other words, due to factors such as urban sprawl and high levels of individual motor vehicle ownership, especially motorcycle, city governments of Jogjakarta and Palembang along with existing agencies have not been able to establish Trans bus systems which can provide a suitable public transport service even with subsidies.

6.2 EA FROM VIEWPOINT OF INTERNATIONAL EXPERIENCES

According to the International Bank for Reconstruction and Development/the World Bank Group (2013), there are several issues that usually arise when creating EA.

They are (1) legal basis; (2) jurisdiction; (3) functions performed; (4) personnel profile and size; (5) management structure and accountability; (6) sources of financing; and (7) evolution, respectively.

6.2.1 Legal basis of EA

Referring to experience of other countries, EA can either be set up as independent authorities or as agencies within national, provincial, or city governments. The specific form depends on a country's political history, current philosophy and the institutional framework of governance. Examination of cases from around the world shows that there are five principal forms that EA for urban transport have taken: (1) an existing government department or municipal authority takes on the function; (2) a separate entity is established under a dedicated statute establishing the entity; (3) a separate entity is created under a generic statute applicable to commercial entities, such as legislation setting out rules governing business; (4) a government order establishes the entity without legislative backing; and (5) multiple jurisdictions reach a mutual agreement to establish an entity.

The Seoul Metropolitan Government and the Ahmedabad Municipal Corporation offer examples of a municipality performing the lead agency function for all modes of urban transport. Jakarta is following this type for both cities since the Transportasi Jakarta Limited is also fully initiated by Jakarta's metropolitan government. In Moscow state, the Department of Transport has overall responsibility for urban and suburban transport. In contrast, Lagos, London, Paris, Singapore, and Vancouver have established separate entities under dedicated legislation. The Indian cities of Indore and Jaipur provide example of separate entity being established under a generic statute to perform the functions of an EA for public transport. The Indore City Transport Service Limited and the Jaipur City Transport Service Limited were set up under a generic national law that regulates commercial and business entities in the country. Indian also has example of EA being set up under executive orders of the government, without legislative backing. A number of Indian cities have set up a Unified Metropolitan Transport Authority (UMTA) by government order. Bungalore, Chennai, and Mumbai are a few examples.

Colombia provides a good example of individual jurisdictions coming together by the agreement to set up metropolitan area institutions to oversee, manage, and plan urban transport. Colombian Law 128 of 1994 provides for municipalities to form metropolitan areas in which combinations of two or more municipalities integrate around a core city.

These different arrangements naturally have their relative strengths and weaknesses. The effectiveness of such an EA, however, depends on how well it has been resourced or staffed with competent professionals and guided by a dedicated and committed chief executive. Thus, based on the experience in other countries, the best arrangement is for an entity to be created through dedicated legislation. Drafting such legislation and having it passed into law takes time. It would be advantageous if a clear road map could be developed to transition the committee arrangement into a new EA model through dedicated legislation.

6.2.2 Jurisdiction of the EA

The jurisdiction that EAs cover varies from city to city. In some cases, such as Ahmedabad and Singapore, it is limited to one municipality, for most part because the given municipality's boundaries encompass a larger area. In such instances, for example in Pereira, it involves two or more municipalities. In others, such as Vancouver, it covers a larger metropolitan area encompassing several adjoining cities. In case of Paris, Syndicats Transportes Ile-de-France (STIF)'s jurisdiction consists of 1,284 municipalities. In India, the UMTAs cover the main city along with some adjacent satellite cities. In Lagos, the Lagos Metropolitan Area Transport Authority (LAMATA)'s jurisdiction extends throughout the entire Lagos metropolitan area.

The basic principle in determining the jurisdiction of an EA for transport is the need to serve the origins and destinations of residents spread throughout multiple municipal jurisdictions. In the largest cities, the need for intercity travel is typically lower, but even in such cases adjoining jurisdictions need to be well connected by a common transport system. From a transportation planning perspective, a larger jurisdiction offers economies of scale that do not necessarily exist for other urban infrastructure needs, e.g. the need for a critical mass of planning expertise. Thus, the jurisdiction for an EA is determined by what constitutes a reasonable economic size for major arterial roadways and public transport systems which are used by travelers making trips that cross jurisdictional boundaries. This accounts for some of the variation seen across the cities.

6.2.3 Functions performed by the EA

In general, there are two major questions that arise when looking at the range of functions of EA:

- Is the EA responsible only for public transport or is it responsible for a comprehensive set of urban transport actions, including those related to the

roadway system?

- Is the EA responsible only for planning and organizing urban transport services or does it also having an active role in the operation of services?

As a comparison, STIF in Paris is only responsible for public transport. STIF is in charge of organizing, coordinating, modernizing and financing public transport. It formulates the urban mobility plan, determines the routes, contracts with the operators, sets the operational, management and financing guidelines, and ensures the coherence of investment programs. In contrast, in London, Singapore, and Vancouver, the EAs' responsibilities are more comprehensive. The situation in Lagos is mixed. LAMATA is primarily responsible for public transport, but also has an expanded role through its responsibility for an identified set of so-called "declared" roads (declared roads are mainly the major arterial roads used for public bus transport operations). Most of all the cases studied by the World Bank Group, the EA has overall responsibility for strategic planning as well as public transport service planning. With regard to the other functions, however, the patterns vary.

While the relationship between the EA and public transport service operators has been evolving, the trend since the 1990s has been to separate the service planning function from actual operations. The rationale for this is that the planning function is performed in the public interest -that is, serving a common public good- while service operations are performed by entities with a commercial interest.

The Seoul Metropolitan Government is the lead entity for urban and transport planning in the city. The city itself consists of twenty five districts (gu), each of which has its own administration. The Seoul Metropolitan Government deals with area-wide policy and services, while district administrations implement these policies and provide self-contained services within the district. In 2005, the Metropolitan Transportation Association (MTA) was established by the Seoul city, Incheon city, and Gyonggi provincial governments. The purpose was to coordinate intergovernmental transportation policies, infrastructure and facility investments, including bus route planning and fare collection for all inter-municipal transportation systems, and to resolve interregional transport problems in the Seoul metropolitan area.

In contrast, in Chile as well as in Indonesia, the national government is effectively the lead authority in shaping entire metropolitan areas beyond what is undertaken at the individual municipality level. This is achieved at the sectoral level by the relevant ministries. The Ministry of Transport and Telecommunications is the lead entity for urban passenger transport, setting operational standards, issuing route licenses, and establishing tariffs. The Ministry of Housing and Urbanism is responsible for

developing the comprehensive strategic plan covering multiple sectors, such as land use, housing, and so on. The Ministry of Public Works oversees construction and maintenance of major roads, while the national police enforce the traffic laws. Traffic management, traffic engineering measures, and parking are the responsibility of the individual respective municipalities. The existence of multiple ministries in influencing transport policies and strategies creates a duplication of responsibility and possibly a conflict of interest.

At provincial or city levels of government of Indonesia, local transportation offices are only responsible for transport policy and service planning. Other functions such as strategic planning, fare setting, driver license, are conducted by other agencies. The responsibilities of transport authority in such countries and case study cities are detailed in **Table 6-1**.

Table 6-1 Responsibilities of transport authority

Functions Performed	Lagos LAMATA	London TfL	Paris STIF	Singapore LTA	Vancouver TransLink	Seoul MTA	Jakarta TJ	Jogjakarta Dishub/P	Palembang Dishub/C
Strategic Planning	✓	✓	✓	✓	✓	✓	✓	X	X
Transport Policy Planning	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fare Setting	✓	✓	✓	X	✓	✓	✓	X	X
Infrastructure Planning	✓	✓	✓	✓	✓	✓		X	X
Service Planning	✓	✓	✓	✓	✓	✓	✓	✓	✓
Driver Licensing/ Vehicle Registration	X	X	X	✓	X	X	X	X	X
Traffic Management & Enforcement	X	✓	X	✓	X	X	X	X	X
Infrastructure Construction & Management	X	✓	X	✓	✓	✓	X	X	X
Common Facilities (terminals, bus stops, depots)	X	✓	X	✓	✓	✓	X	X	X
Public Transport Operations	X	X	X	X	X	X	✓	X	✓
Jurisdiction	Lagos Metropolitan Area	Greater London	1,284 municipalities	All city-state	Greater Vancouver region	Seoul, Incheon, Gyonggi	Jakarta Metropolitan Area	Greater Jogjakarta	Greater Palembang

✓ means this function is performed; X means it is not performed; Dishub/P: Provincial transportation office; Dishub/C: City transportation office

6.2.4 Personnel profile

In some cases, public transport services are operated by direct publically owned subsidiaries of the EA, and the entire workforce is designated as the staff of the EA, whereas in other cases, operations are handled by entirely different entities, with the lead agency only determining the service parameters, e.g., routes, schedules, and fares. However, the staffing needs of EAs vary considerably based on the precise functions it performs and the mechanisms in place for executing them. As a comparison, TfL's 2012 annual report cited staff strength of 22,452. This figure, however, included the personnel of all subsidiary operating entities, among them London Underground Limited and Victoria Coach Station plus several others providing different services. TfL itself has a staff of 3,767. While during fiscal year 2011, LTA in Singapore had a total of 4,361 personnel, 42 percent of them professional staff and 33 percent technical support staff. Similarly, the 2011 annual report for Vancouver's TransLink tallied some 6,800 employees, which included the staff of its subsidiaries. In contrast, in Paris, STIF employs only 330 people, and in Lagos, LAMATA is a very lean organization, with only about 35 professional staff. UMTAs in India generally have no dedicated staff, as they are constituted as senior official committees and are provided secretariat support by an existing government department or agency.

In contrast, the full-time staff members at Ahmedabad Janmarg Limited (AJL) are municipal employees on assignment to AJL. They receive regular public service salaries and are part of the Ahmedabad Municipal Corporation (AMC) career structure. All staff members have two-year contracts (except for the general manager, who is also a deputy commissioner at the AMC). However, the key difference in the human resources available to different agencies is explained by the variations in how staff operating the respective public transport systems is accounted for.

Moreover, hiring adequate staff can be difficult because urban transport as a distinct profession is a relatively recent development in most developing countries.

6.2.5 Management structure and accountability

According to the World Bank Group, the management structures of EA vary to an extent, but in general, they consist of a decision making board that is supported by a full-time CEO and a technical entity or secretariat. The mayor of London chairs TfL, and the deputy mayor is responsible for transport and serves as the deputy chair. In addition, fifteen other members, drawn from a range of interest groups, lend professional strength to TfL. In Singapore, LTA is governed by a fifteen-member board that includes a chair and the LTA chief executive officer (CEO), who heads the

secretariat, comprised of several group directors and subordinate functionaries. TransLink's board consists of nine directors, each appointed to six-year terms by a mayors council, composed of all the mayors of metro Vancouver. A CEO, in charge of day-to-day operations, is appointed by the board.

STIF has a twenty-nine-member board comprised of 15 representatives from the Region, 5 from the city of Paris, and one from each of the 7 departments within the region. LAMATA has a thirteen-member board of directors. The board, appointed by the governor of the State, is representative of the authority's stakeholders, consists of representatives of transport operators, transport unions in Lagos state, the organized private sector, the general public, local government areas, and transport-related Lagos state government agencies. The only full-time member is the managing director/chief executive officer (MD/ CEO), who heads the secretariat.

Therefore, the typical broad structure of the EA consists of a supervisory body or policy board, which is where key decisions are made. This governing body is supported by a technical secretariat, or unit, headed by a full-time professional.

6.2.6 Sources of financing

The two primary questions regarding the financing of lead institutions are as follows:

- From where does the lead agency obtain its financial resources -direct government grants, taxes, commercial functions, or a combination of the above?
- How much funding should the EA have control over -just enough to meet its own administrative costs and the costs of some studies and research or a larger amount that would enable it to actually make capital investments and subsidize the operating deficits of on-going services?

As an example, in London, TfL receives grants from the UK Department of Transport that consist of two components: a grant to finance its investment program and a general grant to be used for operations, including its own. In 2011–12, TfL received £4,727.5 million by way of grants. In addition, it received £4,180.9 million by way of other income, of which 78 percent came from fares, 5.4 percent from congestion fees, and 3.1 percent from advertising. The rest of the other income was derived from a host of other smaller sources. It paid £2,155.6 million to its subsidiaries to meet their operational costs.

In Singapore, LTA's budget for financing the capital cost of projects is funded primarily by grants from the government. In addition, it has an operational budget funded through a "management fee" that it receives from the government and certain

other revenues that accrue to it, such as vehicle registration fees, advertising fees, and fines. During 2010-11, LTA received a total income of S$1,051 million, of which 38 percent was from management fee from government, 11 percent was other administrative fees (e.g., vehicle parking certificate fees, vocational license fees, vehicle inspection fees, RTS license fees), and 51 percent was a grant from government toward operational expenditures.

TransLink has been authorized by the respective Vancouver jurisdictions to collect a fuel tax, property tax, and parking sales tax for use toward transport investment and operating costs. During 2011, C$682 million were collected, out of which C$312 million was derived from the fuel tax, C$280 million from the property tax, and C$54 million from the parking sales tax. Another C$37 million came for smaller levies and taxes.

In 2011, funding for public transport operations in the Paris region totaled €8,336 million. The sources of revenue include transport tax (37.4%), fare (30%), public subsidies (20.2%), employer (9.6%), and others (2.8%). In Lagos, the law grants LAMATA powers to levy and collect user charges in connection with the provision of its services and to collect any other tariffs, fees, and road taxes as may be authorized by the governor. A transport fund was set up in 2006 with dedicated funding from the Lagos state budget provision, license fees (hackney permit, road taxes, license plate registration, and vehicle registration), bus concession fees, and other road user charges (tolls). The transport fund has shown a steady increase since its inception in 2006 and in 2011 stood at approximately US$10 million.

Referring to these experiences, it is extremely important to ensure that lead agencies have the financial muscle to actively fulfill their coordinating and facilitating role. It is this ability that enables them to exercise influence in discharging their coordinating role.

6.2.7 Evolution of the EA

Experience from a number of other countries indicates that, the structure and form of different EA has evolved over time in response to efforts by national and city authorities to improve the delivery of transport services. In some cases, instead of institutional restructuring, an EA might be created as a new entity and given responsibility for coordination, without really causing ripples in an existing institution. In such cases, they also tend to take on responsibilities for which no one was previously responsible. In other cases, existing institutions are restructured, reformed or even eliminated to allow a shift in responsibilities to the new institution. The process of

evolution can be difficult and time consuming. It is often several years before institutions can stabilize and perform a meaningful role.

As a comparison, Singapore's first integrated land use and transport plan was issued in 1971, mapping out the basic framework for physical planning along designated corridors. In an attempt to integrate the planning, development, implementation, and management of all public and private infrastructure, the Land Transport Authority was created in 1995 with the merger of four government agencies: the Roads and Transportation Division of the Public Works Department, the Land Transport Division of the Ministry of Communications (now the Ministry of Transport), the Mass Rapid Transit Corporation, and the Registry of Vehicles.

London's different modes of public transport were first brought together in 1933, under the control of the London Passenger Transport Board (LPTB), which was the EA from July 1, 1933, to December 31, 1947. It unified services in the London area for the first time. After several times of change, the Greater London Authority, a replacement authority for the Greater London Council (GLC), was set up in 2000, with a transport executive, Transport for London, taking control as the EA for transport on July 3, 2000.

Efforts to establish a body to coordinate public transport in Paris began in 1938, and a decade later of January 7, 1959, replaced the Regional Transport Office for Paris (ORTP) with the Paris Transport Union (STP). Under Law 2000-1208 of December 13, 2000, the STIF replaced STP and currently remains the EA for public transport in the region.

Vancouver's public transport system dates back to 1897, with streetcar lines operated by the British Columbia Electric Railway Company (BC Electric), a private utility company regulated by the province of British Columbia. Similar to London, consolidation and strengthening of the role of the public transport services in the Greater Vancouver are amended regularly. On April 1, 1999, the Greater Vancouver Transportation Authority (GVTA), also known as TransLink, was established and became the agency responsible for planning, funding, building, and marketing an integrated transportation system for the Greater Vancouver Regional District (GVRD), now called Metro Vancouver.

The origins of LAMATA are in the Lagos Mass Transit and Transport Systems Management Program Study (LMTS) of 1992, which identified the need for an authority to provide a single focal point for Lagos. In 1996, the Detailed Framework for Establishment of LAMATA (DFEL) was developed. As noted, the law to establish LAMATA passed in 2002, and formally enacted on December 2, 2003. The law

establishing LAMATA was strengthened in 2007 to include planning and regulatory functions across the various modes of transport

6.3 STEPS TOWARDS CHANGE

6.3.1 Specific unit within the machinery of government

It should be recognized that the bus industries in over twenty cities that implemented new urban bus system are currently in transition from an unregulated structure to a formal and efficient industry. Each of the cities continue to search for the most appropriate type of institutional arrangement to be established, which fits local circumstances, aiming for improving service quality and reliability of new urban bus system's service delivery. In Jogjakarta, an effective way to address this is to establish a specific unit within the machinery of government, which would be responsible for the success of the urban bus project. For convenience, such a unit has been referenced simply as a project implementation unit (PIU). Such a unit can be established within the government structure to deliver the project, which would receive specific capacity development capabilities to ensure the delivery according to the supporting decrees of the governor.

Complementing and supporting the role of the PIU would be relevant agencies (including local transportation office (DISHUB), local planning and development agency (BAPPEDA), public work agency (BINA MARGA), and police agency (POLDA/POLRES), which would provide direct assistance with timely decisions, supporting budgets and the ongoing management of the corridors as per the requirements of the project. Naturally, all of these actions would be within the scope of the decree by the governor, which requires these to be carried out within a nominated time frame and provides the ongoing authority to do so. This unit would ideally have the ability to borrow (within the guidelines of standard Government procedures), implement and be accountable for the delivery of the investment program for the short, medium and long term phases. A structure has also been agreed in principle at the Office of the Governor level and is shown in **Figure 6-7**.

Meanwhile, during the last fifteen years, Indonesia has devolved responsibility for local transport to the governments of municipalities and regencies by the enactment of Law No. 22 of 1999 on Regional Government Administration and Law No. 25 of 1999 on the Fiscal Balance between the Central and Regional Governments. This situation makes it difficult geographical scope of the authority to cover the full extent of the conurbation transport network, overcoming problems of coordination between constituent authorities. The PIU has the role of management of the multiple functions is

fragmented and the norm is multiple government agencies, at different levels of government with different or similar mandates in urban transport infrastructure and services.

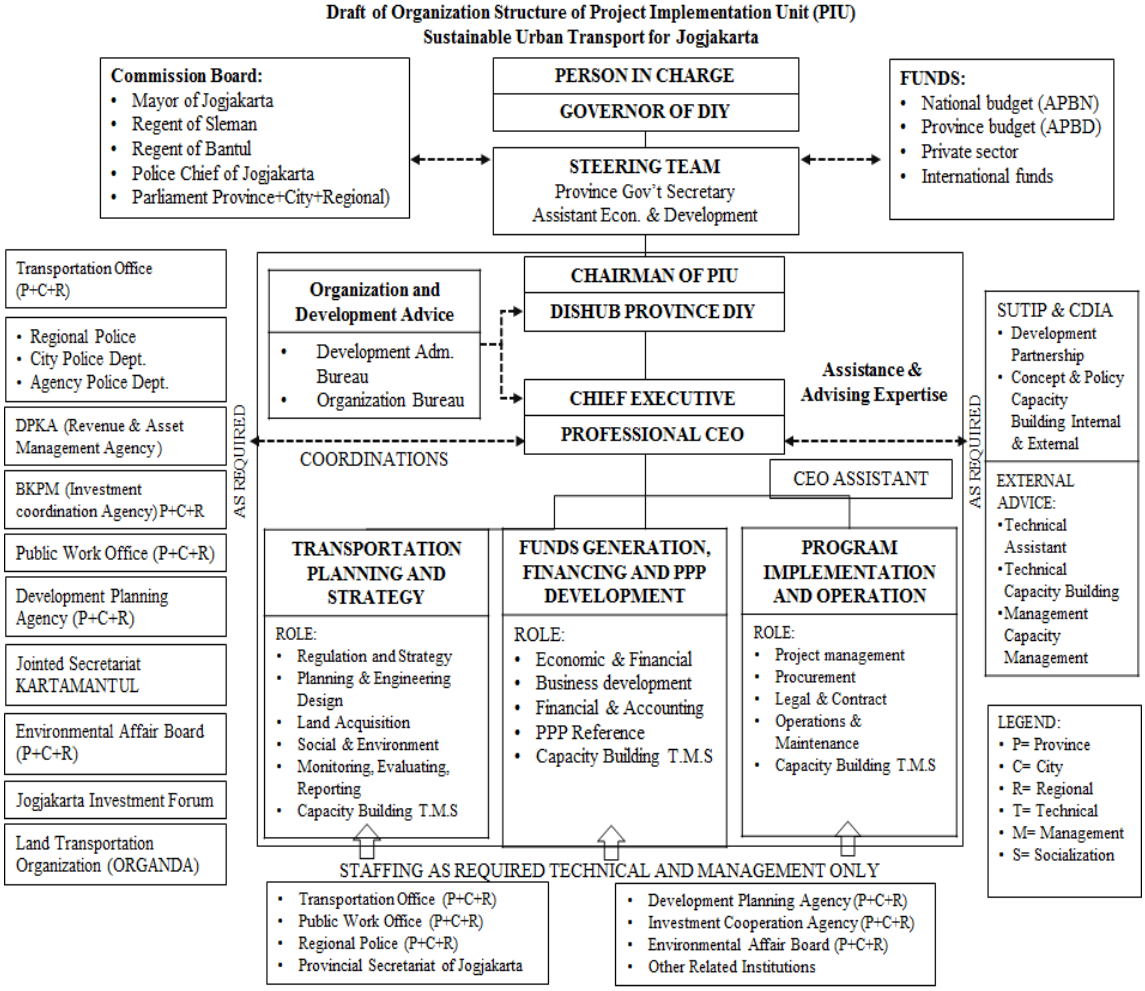


Figure 6-7 Proposed organizational structures of PIU

Jogjakarta region itself is covering a provincial, a city and two regencies, each with their own local government. As a result of rapid growth and urbanization, Jogjakarta's population surged, huge squatter settlements developed, quality of life suffered and the environmental deteriorated rapidly. These problems put a considerable strain on the capability of individual local government units to deliver basic services, stretching their resources to the limit. PIU is required by its proposed structure to maintain links with the international agencies, local governments, national agencies performing functions at the local level and the private sector. These basic services include transportation planning and strategy, which incorporates the regulation and strategy, planning and engineering design, land acquisition, social and environmental, monitoring, evaluating and reporting, capacity building; funds generation, financing and

PPP (public private partnership) development, which incorporates the economic and financial, business development, financing and accounting, PPP reference, capacity building; program implementation and operation, which incorporates the project management, procurement, legal and contracts, operations and maintenance, capacity building.

Refer to roles and responsibilities, PIU seems almost similar to the LTA of Singapore, except degree of integration and organizational structure. While Singapore increased the degree of integration by merging government's transport institutions into a single LTA, in Jogjakarta, the PIU remains separate, and coordination of different agencies and operators is the responsibility of a provincial transportation office (DISHUB PROVINSI). The LTA is directed by an appointed board of directors comprising fifteen representatives of business, academia, the professions, labor and community organizations, while PIU is an established unit within the Government structure to deliver the project, which would receive specific capacity development capabilities to ensure the delivery according to the supporting decrees of the Governor. Concerning the legal basis PIU set up as a unit within provincial government, in contrast to Lagos, London, Paris, Singapore, and Vancouver which establish separate entities under dedicated legislation, rather than Governor Decree.

In terms of jurisdiction, the PIU most similar to LAMATA of Lagos where jurisdiction of the EA extends throughout the entire Jogjakarta metropolitan area as a result of agglomerations that extend across both Sleman and Bantul regencies with a population of over 2.5 million people (2013). Greater Palembang itself across several regencies: Banyuasin, Muara Enim and Ogan Ilir consist of more than 1.5 million populations (2013). Toughest challenge of the PIU is a need to coordinate across adjacent regencies in planning TransJogja and TransMusi networks to ensure a consistent set of policies and investment including Trans bus coverage, fare, service quality, main road capacity across municipal boundaries.

Meanwhile, the PIU is not directly responsible for the actual operation of Trans bus services as commonly in most cases, but oversees the operation and management of common transport facilities. In Singapore, LTA owns and operate the interchange facilities and intermodal terminals. The transport services themselves, are operated by two private companies contracted to run the metro and bus systems. In London, common facilities are operated and managed by TfL or its subsidiaries. The metro system is operated by a Tfl subsidiary, whereas bus services are contracted to private operators. Most of the other cities are correspond to the two patterns of both cities with a few adjustments while PIU refers to **Table 6-1** performs strategic planning, transport

policy planning, infrastructure planning, traffic management and enforcement, infrastructure construction and management and the common facilities including terminals, bus stops and depots.

There is no detailed information on staff number of PIU, but most of the full time staff members as shown in **Figure 6-7** are municipal employees on assignment to PIU, approximately the same as the personnel profile between LAMATA of Lagos and AJL of Ahmedabad, whereas a number of key executives might be hiring from the market as well as training and skill enhancement of existing staff. In the case of Transportasi Jakarta Limited, some positions were advertised on more than one occasion, since urban transport as a distinct profession is a relatively recent development in Indonesia, in addition to the differential between public and private sector pay and the inability of the municipality to offer competitive salaries.

In terms of management structure, the PIU model is more similar to LAMATA of Lagos, where member board of chief executive officers is appointed by the governor as person in charge of day to day operations. In carrying out their daily duties, the board is responsible to the DISHUB PROVINSI as chairman of the PIU, while TransLink's board consists of nine directors, each appointed to six years terms by a mayors council, composed of all mayors of metro Vancouver. The DISHUB PROVINSI as a lead of PIU consists of policy board, which is where key decisions are made. Since the number of agencies involved as well as the entire long chain of organization, PIU might be classified as the typical broad structure of EA.

Financial resources are also one of the complicated problems in almost all of the developing cities of Indonesia due to unavailability of the effective, integrated institutions for urban transport policy-making and administration, with expert technical and financial staff, in both the public and private sectors. Singapore and Hong Kong experiences are clearly indicated that well-developed financial institutions are critical to support capital-intensive public transport investments. Referring to Fig. 7, the PIU obtain its financial resources from central and provincial government, private sector and international agencies, whereas both Tfl and LTA's budget for financing the projects are funded by grant from their governments. As an example, LTA received a total income of S$1,051 million, and the monies are used to defray operating expenditures, such as staff remuneration (19%), road maintenance, street lighting, maintenance of LTA property (40%), interest on loans raised by LTA, as well as the repayment of loans from government (40%) (2010-11). The less portions of grant for staff remuneration mean the highly efficient of organizational structure of lead agency. PIU as a new institution, first of all is challenged to efficiently and effectively in terms of organizational structure as

expressed clearly by LTA, TfL and other lead agencies.

6.3.2 Barriers to project success

It should be recognized that complexity of this aspect of the urban transport sector is likely to remain a challenge for the almost all cities of Indonesia, including Jogjakarta and Palembang. This is because it relies on effective management practices. History has shown that provincial and city governments of both case study cities, even the capital Jakarta, have been deficient in this respect. Thus, the procedure and role of lead agency will require a coordinated effort to be effective and deliver the outcomes being expected. Furthermore, ongoing concerns by the local parliament over the poor cost recovery of the TransJogja and TransMusi operations and the continuing drain on the limited financial resources of the both provincial and city governments as well as inadequate capacity or commitment to ensure Trans bus system is supported and general traffic compliance is maintained and inability of city government to develop the capacity required to plan for, provide and manage the improvements being expected.

6.4 CONCLUSIONS

This chapter developed and applied a conceptual framework highlighting the established agency or lead institution to evaluate the current progress of new urban bus system projects in Indonesian cities. A select number of cities and metropolitan regions and how urban mobility issues are being managed are also presented for comparison. Their experience clearly shows that there are wide differences between countries as to the level at which transport planning and regulatory responsibilities are carried out.

Some Asian developing countries, including Indonesia, have devolved responsibility for local transport to the government of provinces and metropolitan cities, which enables the geographical scope of the authority to cover the full extent of the conurbation, overcoming problems of coordination between constituent authorities. Both Jogjakarta and Palembang cities explored regulatory reform from unregulated to a hybrid model, establishing a PIU with a certain degree of regulatory touch. Ideally, it is desirable to isolate PIU as much as possible from political change, though overall policy has to be approved by the city political leaders but if the lead agency is successful and respected, the likelihood of erratic change might be much reduced. Moreover, PIU should have adequate regulatory powers for effective urban transport management in addition to specialized staff skills and intensive professional staff and also the availability of funds for implementing, enforcing or playing its powerful role in transport strategy with the necessary supporting legal structure.

Referring to a number of cities that have been successful in establishing effective lead institutions, PIU must encompass multiple functions, modes, and cover all jurisdictions in a metropolitan area as well as prove them capable to pursue and achieve its assigned objectives. Hence, create a public transport authority ideally to have overall responsibility for the planning, design, and implementation of public transport infrastructure and services as demonstrated by TfL, LTA, TransLink and MTA in comprehensive planning that is integrated functionally, spatially, sectorally, and hierarchically. However to date, no new formal authority has been established for TransJogja and TransMusi; daily operation of urban bus service in case study cities are mostly controlled by operator without adequate supervision of provincial and city governments.

CHAPTER 7

MEASURING CUSTOMER SATISFACTION INDEX (CASE STUDY OF TRANSJOGJA)

This chapter presents the results of evaluation of commuter's satisfaction with new urban bus services based on user perceptions and expectations. This part provides a comprehensive tool for measuring the overall transit service quality, named Heterogeneous Customer Satisfaction Index (HCSI), by considering different service aspects. The analyses in this chapter are based on questionnaire survey results of 246 respondents that were obtained in phase-III survey. To measure service quality, users completed information about 8 service aspects which consists of overall 27 service attributes. The details of questionnaire items related to analyses of this chapter are given in appendix C. These analyses include the distribution of respondent's socio-economic characteristics, commuter's satisfaction with new urban bus service, user expectations from new urban transport services, and the actual service quality.

7.1 DISTRIBUTION OF RESPONDENTS SOCIO-ECONOMIC AND SERVICE CHARACTERISTICS

7.1.1 Overall distribution

Though the population is not significantly spread between male and female, the majority of the habitual transit users is female (57% of the sample). Most of the interviewed users are singles (62%) and age is between 21 and 40 years (38%). As previously predicted, student is the largest group of interviewed respondents (57%); in addition, more than a third of urban bus users live outside municipality (37%) indicating a high urban sprawl of Jogjakarta city. Then, most of the respondents have preference to use the new urban bus to support their mobility (48%). Moreover, about 59% of the sample are belongs to a middle class of family income and about 24% are a lower class; the classes of income refer to the net monthly income of the family unit, expressed in Rupiah. Almost 80 percent of respondents said they get bus stop by walking; only four percent of respondents choosing park and ride, and the rest (18%) are dropped by family members. The more detailed characteristics of socio economic of respondents are described in **Table 7-1**.

Table 7-1 Socio Economic Characteristics

		Numbers	%
Gender	male	105	43
	female	141	57
		246	100
Marital status	married	94	38
	single	152	62
		246	100
Age	up to 20 years	81	33
	from 21 to 40 years	94	38
	from 41 to 60 years	57	23
	over 61	14	6
		246	100
Place of living	municipality area	155	63
	outside the municipality	91	37
		246	100
Family members	up to two persons	91	37
	from three to four persons	108	44
	over five persons	47	19
		246	100
Employment	student	141	57
	civil servant	37	15
	private company	41	17
	entrepreneur	15	6
	others (pensioner, housewife, etc.)	12	5
		246	100
Reason for using urban buses	did not own any car	89	36
	prefer to make use of new service	118	48
	unable to drive	39	16
		246	100
The way to reach bus stop	walking	193	78
	park and ride	9	4
	others (drops by family member, etc.)	44	18
		246	100
Family income level (IDR)	up to 1 million	59	24
	from 1 million to 2.5 million	93	38
	from 2.5 million to 5 million	51	21
	over 5 million	43	17
		246	100

7.1.2 Urban bus service characteristics

Greater Jogjakarta Special Region is an urban agglomeration within Jogjakarta as a provincial capital. It consists of three local governments within the region: one municipality, that is, the City of Jogjakarta, and two districts, namely Sleman in northerly direction and Bantul in southern capital. The area covering 234 km2 was inhabited by 2.3 million people in 2013. Jogjakarta city's population alone is around

510,108 people within 32.50 km2 area (**Figure 7-1**). Many university students live in Jogjakarta and surrounding areas; approximately 51,000 students and 2,400 lecturers attend the University of Gadjah Mada alone. Other big universities with more than 10,000 students are Jogjakarta State University, Islamic Indonesia University, and Atma Jaya University, respectively.

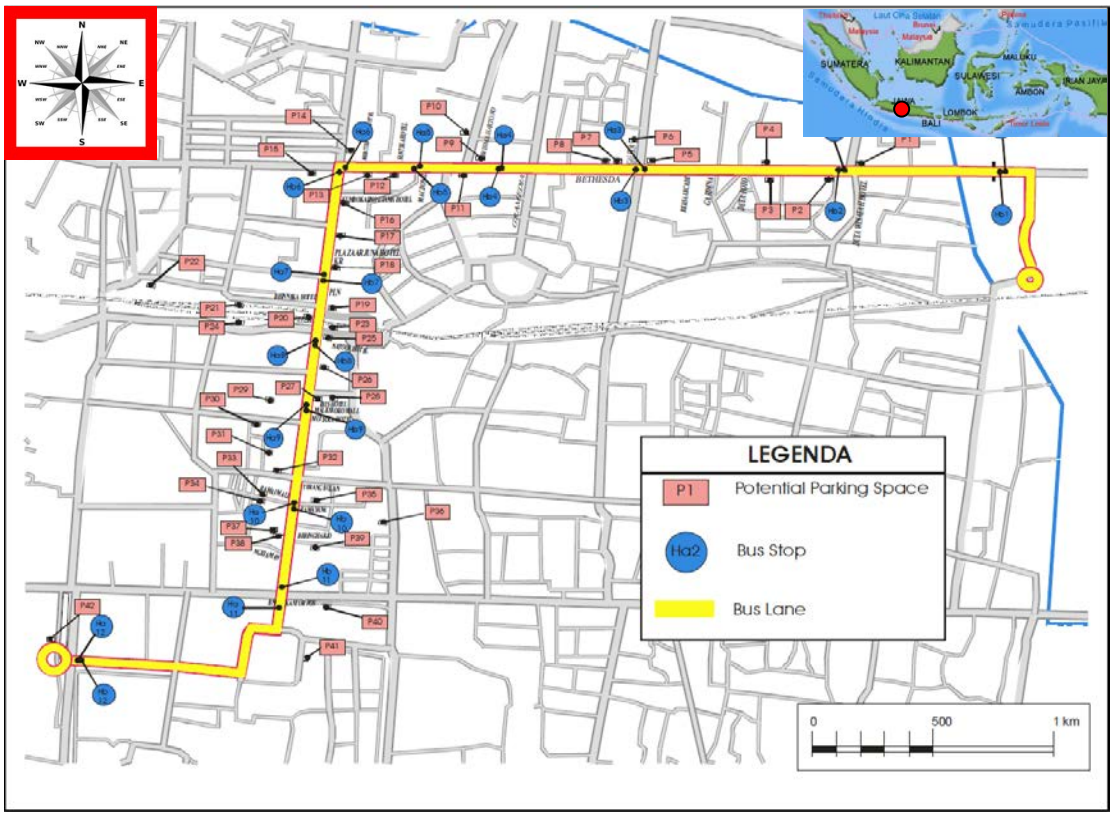


Figure 7-1 Jogjakarta city

The analyzed transit system is a new urban bus service initiated by MoT and Jogjakarta local government to promote a smart bus-based urban transport system employing features such as air-conditioned busses, scheduled services, designated shelters and a smart card ticketing system. A new feature of TransJogja is the introduction of buy the service licensing scheme, or well-known as gross-cost contract, as an attempt to abolish the daily sublet revenue sharing system between the bus owner and bus operators that is commonly applied. In this new scheme, the government sets up service standards to be fulfilled by the operator. The service provided by the operator will be compensated based on kilometer-traveled as agreed in the initial contract. A brief city and transit service characteristics are presented in **Table 7-2**.

Table 7-2 Urban bus service characteristics

Urban Area Characteristics		
	Area (km²)	32.5
	Population (people-2013)	510,108
	Province	Jogjakarta Special Region
	Provincial capital	Jogjakarta
Physical Measures		
	Year of implementation	2008
	Number of fleets	54
	Number of routes	3
	Bus capacity	40
	Average length/route	34
	Number of bus stop/route	17
	Dedicated lane available	No
Regulatory Framework		
	Regulator	Prov. Transportation Office
	Bus operator	Consortium
	Bus provider	MoT, province, consortium
	Approach to competition	gross cost
	Other modes within the city	bus, PT, rickshaw
	Way of payment	cash/card at bus stop
	Multimodal integration	Airport
	Service time	6 a.m. to 9 p.m.
Operational Performance		
	Daily ridership	16,000
	Load factor (%)	40
	Headway (minutes)	5-10
	Average speed (km/h)	20-30
	% Fare subsidy	36.4
	% Fare box revenue*	35

7.2 USER PERCEPTIONS AND EXPECTATIONS

This section discusses the results of user satisfaction with new urban bus services. Originally, the respondents described a rating of importance and a rating of satisfaction on each attribute on a 10-point scale. Firstly, respondents are asked to rate the satisfaction of all service attributes, ranging from 1 totally dissatisfied to 10 totally satisfied (2 very dissatisfied; 3 dissatisfied; 4 somewhat dissatisfied; 5 less dissatisfied; 6 less satisfied; 7 somewhat satisfied; 8 satisfied; 9 very satisfied). Second, respondents are asked to rate the importance of all service attributes, ranging from 1 no important at all to 10 extremely important (2 very unimportant; 3 unimportant; 4 somewhat unimportant; 5 less unimportant; 6 less important; 7 somewhat important; 8 important; 9 very important). Hence, an evaluation of TransJogja service quality is carried out by examining the rate of satisfaction and importance by means of the calculation of the average satisfaction and importance scores.

7.2.1 Importance and satisfaction of service aspects

Normally, the attributes with an average satisfaction score lower than 6.0 can be considered as critical service aspects. According to analyzed services, as many as 17 of 27 attributes had an unsatisfactory average score; this indicates that most of respondents felt unsatisfied with the TransJogja transit service. Those seven attributes with the lowest average satisfaction score are the follow up of the complaint and opinion, road accident caused by TransJogja, availability of parking at terminal and cost, the effect TransJogja on congestion, road deterioration caused by TransJogja, length of staying on board, and the effect of TransJogja on the economics, social, cultural and tourism. The attributes with the highest average satisfaction scores are safety against crimes on bus, security at the bus stops while waiting for the bus, and availability of shelter and benches at bus stop (**Table 7-3**).

Further, by exploring the importance rates, the most important attributes for the passengers can be identified. By concerning the average importance scores, all the service attributes are considered important by the TransJogja passengers as they are practically represented by an average importance score close to or higher than 8.0. The attributes with the highest average importance scores are reliability of vehicle and competence of drivers, reliability of buses on the specified range (service frequency), and safety against crimes on buses. These three attributes revealed average importance scores ranging from 9.52 to 9.10, pointing out that the service attributes are considered very important by respondents.

Table 7-3 Importance and Satisfaction Statistics

			Importance			Satisfaction		
Service Aspect	Service Attribute	No	Mean	Var.	Std.	Mean	Var.	Std.
Route Characteristics	Av bus stop near home and destination	1	8.65	0.91	0.96	5.82	1.99	1.41
	Route characteristics	2	7.98	0.91	0.96	5.40	2.38	1.54
Service Characteristics	Operation hours	3	8.48	0.91	0.95	5.59	2.30	1.52
	Service frequency	4	8.61	0.98	0.99	5.14	2.17	1.47
	Av of shelter and benches at bus stop	5	8.53	1.09	1.04	7.61	0.92	0.96
Service Reliability	Reliability of buses that come on the specified range	6	9.37	0.45	0.67	5.38	2.03	1.42
	Vehicle reliability & competence of drivers	7	9.52	0.32	0.56	7.07	0.94	0.97
	Length of staying on board	8	8.24	0.85	0.92	4.81	3.34	1.83
Information	Av of map/route at bus stops	9	8.70	0.54	0.73	7.06	1.74	1.32
	Av of service information by phone, mail, internet	10	8.37	0.67	0.82	5.18	2.21	1.49
	Av of information on buses regarding bus stops, transfer points	11	8.41	0.69	0.83	6.93	1.30	1.14
	The ease to submit complaint, request, opinion	12	8.35	0.68	0.83	5.36	2.20	1.48
	Follow up of the complaint, opinion	13	8.50	0.61	0.78	3.99	2.10	1.45
	Av of parking at terminal & cost	14	8.81	0.69	0.83	4.24	2.57	1.60
Comfort	The ease of payment	15	8.43	0.62	0.79	7.35	0.86	0.93
	Quality of air conditioning on bus	16	8.43	0.75	0.87	5.66	3.18	1.78
	Cleanliness of interior, seats & windows	17	8.56	0.72	0.85	5.22	2.45	1.57
	Bus overcrowding	18	8.83	0.75	0.87	6.89	1.39	1.18
Safety and Security	Safety against crimes on buses	19	9.10	0.52	0.72	7.91	0.78	0.89
	Security at the bus stops while waiting for the bus	20	8.93	0.66	0.81	7.82	0.98	0.99
	Helpfulness of personnel	21	8.58	0.58	0.76	6.45	2.33	1.53
Fare	Ticket cost	22	8.85	0.63	0.79	7.48	1.17	1.08
Environment	TransJogja effect on emission	23	8.49	0.77	0.87	5.46	2.47	1.57
	TransJogja effect on congestion	24	8.84	0.79	0.89	4.57	1.93	1.39
	Road accident caused by TransJogja	25	8.76	0.70	0.84	4.03	2.29	1.51
	Road deterioration caused by TransJogja	26	8.17	0.71	0.84	4.78	1.53	1.23
	Effect of TransJogja to the economics, social, cultural & tourism	27	8.95	0.81	0.90	4.88	3.10	1.76

7.2.2 Calculating the customer satisfaction index

In order to figuring CSI and HCSI, both satisfaction and importance rates were analyzed also by means of the variance. This type of measures enables the heterogeneity of passengers in the evaluation of service quality to be verified.

Table 7-4 Calculating the customer satisfaction index

Attribute	Importance Weight	Weighted Score	Corrected Importance Weight	Corrected Satisfaction	Weighted Score
1	0.037	0.22	0.027	4.453	0.12
2	0.034	0.18	0.025	3.203	0.08
3	0.036	0.20	0.027	3.552	0.09
4	0.037	0.19	0.025	3.183	0.08
5	0.037	0.28	0.022	16.405	0.37
6	0.040	0.22	0.059	3.740	0.22
7	0.041	0.29	0.086	13.959	1.20
8	0.035	0.17	0.028	1.811	0.05
9	0.037	0.26	0.046	7.497	0.35
10	0.036	0.19	0.036	3.169	0.11
11	0.036	0.25	0.035	9.684	0.34
12	0.036	0.19	0.035	3.415	0.12
13	0.036	0.15	0.040	1.978	0.08
14	0.038	0.16	0.036	1.823	0.07
15	0.036	0.27	0.039	16.329	0.63
16	0.036	0.20	0.032	2.632	0.08
17	0.037	0.19	0.034	2.908	0.10
18	0.038	0.26	0.034	8.914	0.30
19	0.039	0.31	0.050	20.871	1.05
20	0.038	0.30	0.038	16.254	0.62
21	0.037	0.24	0.042	4.665	0.20
22	0.038	0.28	0.040	12.570	0.51
23	0.036	0.20	0.032	3.160	0.10
24	0.038	0.17	0.032	2.826	0.09
25	0.038	0.15	0.036	1.854	0.07
26	0.035	0.17	0.033	3.925	0.13
27	0.038	0.19	0.032	2.010	0.06
	CS Index	5.87	Heterogeneous CS Index		7.22

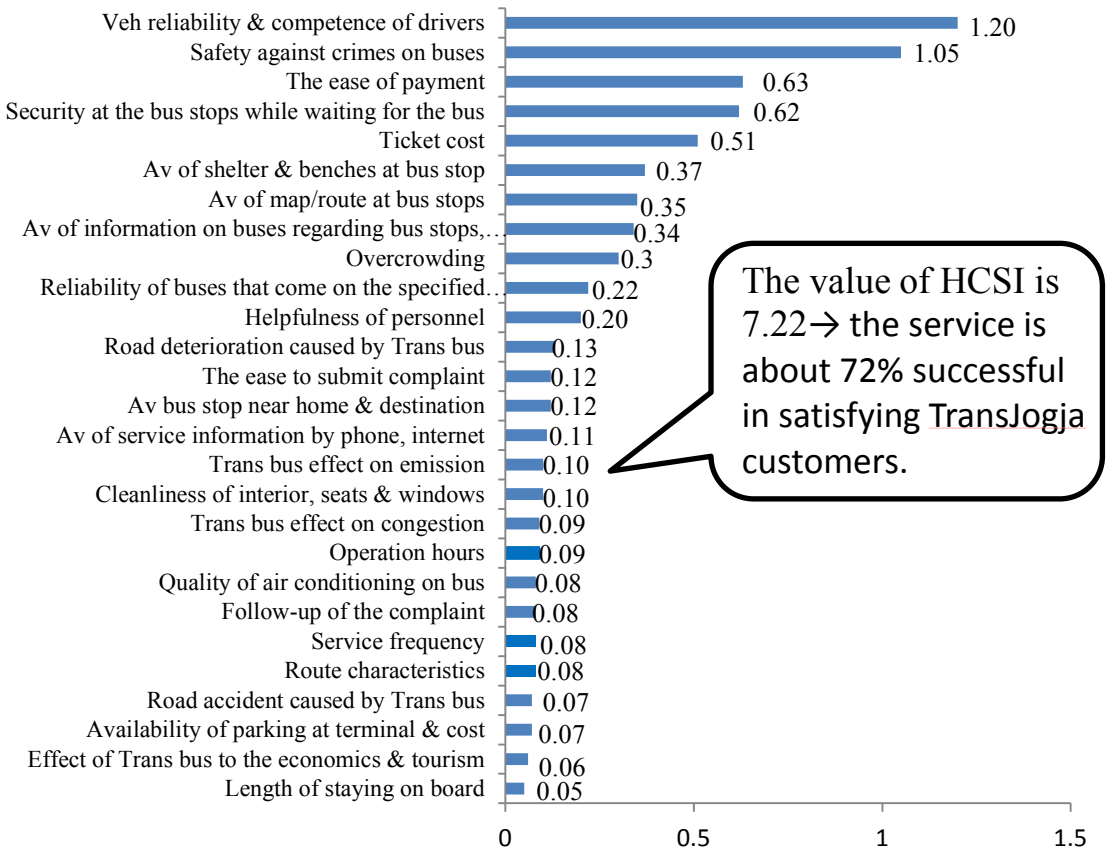


Figure 7-2 The weighted scores of heterogeneous customer satisfaction index

By this way, the passenger judgments on expected quality (rate of importance) are much more homogeneous than the judgments on the perceived quality (rate of satisfaction). In fact, the value of average variance, calculated by considering the rates expressed on all the attributes, is 0.72 for the importance and 1.95 for the satisfaction. Then, the coefficients of variation are 9.7 and 23.4 percent, respectively. These figures also indicate that the passenger judgments on the perceived quality are around three times more heterogeneous than the judgments on the expected quality.

Eventually, both satisfaction and importance rates expressed by the bus passengers were used for the calculation of the CSI and HCSI as described in **Table 7-4** and **Figure 7-2**. In the third and sixth column, the weighted scores are reported, which represent the contribution of each attribute to the final value of CSI and HCSI, respectively.

7.3 IMPLICATIONS OF CUSTOMER SATISFACTION INDEX

Based on the findings in the **Tables 7-3** and **7-4**, it can be clearly seen that the city has failed to fulfill the customer satisfaction on TransJogja service quality, even though the transit system has been running for more than five years. Passenger judgments on perceived quality show that the only 7 of 27 service attributes are considered somewhat satisfied with the transit service as they are practically represented by an average satisfaction score close to or higher than 7.0. The attributes with the highest average satisfaction scores are safety against crimes on buses (7.91), security at the bus stops while waiting for the bus (7.82), availability of shelter and benches at bus stop (7.61), ticket cost (7.48), ease of payment (7.35), vehicle reliability and competence of drivers (7.07), and availability of map/route at bus stops (7.06) (Table 3). Furthermore, there is no an average satisfaction score close to or higher than 8.0 indicating that, none of the respondents is satisfied with the quality of transit service provided. On the contrary, as many as 20 of 27 service attributes reveal that average satisfaction scores ranging from the highest 6.93 (availability of information on buses regarding bus stops, transfer points) to the lowest 3.99 (follow up of the complaint and opinion).

This empirical evidence has demonstrated that most of the service attributes are considered as neither less satisfied nor dissatisfied by respondents. As mentioned previously, users who have a good experience with transit will probably use transit services again, whereas users who feel dissatisfied with transit may not use the next time. Unfortunately, TransJogja has failed to encourage number of passengers despite the increasing of travel demand from population growth since its service quality has continually declines as well as most of customers are unsatisfied with service provided.

The projects in terms of financial and organizational reforms on public transport industry aiming to reform the existing regulatory policies and operational practices, are facing multiple obstacles to achieving organizational goals in both operational and management levels. The comprehensive assessment and evaluation required to include not only the related operation, financing, regulations and enforcement but also other policies neglecting business and commercial elements on public transport industry. These should be done through a series of comprehensive studies covering development of a modern, commercial and customer oriented strategy followed by training and workshops to local government staffs as well as bus operators on effective route and service planning, operational and maintenance system, followed by a demo project as a showcase for better operational system.

Analyzing root causes of problems such as unstable service frequency, and

other discomfort aspects should be looked at to assist the operator with a financial scheme in the procurement of new buses and spare parts, for example through credit programs and cooperatives, or through some sort of tax incentives. An established of a policy reform and deregulation in urban public transport financing, should be followed by an improved standard for TransJogja service and building institutional capability of the provincial government in administering urban transport system and in developing an appropriate urban transport strategy. After more than five years to focus more on the expansion of service, it is the suitable time for the MoT and local government to focus solely on sustaining the attractiveness of TransJogja as before.

7.3.1 Considerable weight contribute satisfaction

By concerning the experimental results and findings, the value of CSI is 5.87. By weighting satisfaction and importance scores on the variance, authors obtain a value of HCSI equal to 7.22. The difference between CSI and HCSI values is as a result of the different contributions of each service attribute to each index. Obviously, if the variance of importance rates is the same for all the attributes and, contemporaneously, the variance of satisfaction rates has the same value for all the attributes, CSI and HCSI value are equal.

In the meanwhile, by examining the weighted scores regarding CSI, it emerges that the attributes giving the highest contribution to overall satisfaction are safety against crimes on buses, security at the bus stop while waiting for the bus, vehicle reliability and competence of driver, availability of shelter and benches at bus stop, and ticket cost. However, the values of the weighted scores range from 0.15 to 0.31 as shown in **Table 7-4**. Of course, the other attributes also make a considerable contribution to the overall value of CSI.

Although of the gap between the two indices is 1.35, the weighted scores of CSI are very different compared to those of HCSI, which range from 0.05 to 1.20. The two attributes with the highest weighted scores for HCSI are vehicle reliability and competence of drivers, and safety against crimes on buses, respectively. Findings indicate the four most relevant service attributes for CSI are also relevant for HCSI. They are safety against crimes on buses, vehicle reliability and competence of drivers, security at the bus stops while waiting for the bus, and ticket cost, respectively. Furthermore, the availability of shelter and benches at bus stop and the availability of map/route at bus stops show the considerable weights.

7.3.2 Environmental issues

The integration of environmental concerns into urban transport policy has become important issues over the last few decades. Providing new transit system without being followed by tightening the use of private vehicles may not obtained optimal results, as experienced by the city of Jogjakarta. As the city is dominated by university students and as the students have become wealthier, most of them have bought motorcycles as the main mode to support their daily activities. Ease of credit system and low cost of vehicle ownership also contribute to the rapid growth of vehicle ownership. Nowadays, motorcycles make up more than 80 percent of the city's vehicle fleet of 257,000 and have largely displaced other forms of travel including for short trips, although these trips are more efficiently done by foot.

The presence of TransJogja as clearly expressed by respondents is shown a less contribution to environmental aspect; from 7.22 of HCSI value, the weighted scores of effects on emission, congestion, and road accident are only 0.10, 0.09, and 0.07, respectively, indicating those service attributes contribute less than 5 percent of HCSI value. In other words, after over five years of operation, the new transit system has not been able to attract more private vehicle users and reduce the level of emission, congestion and accidents. Since Jogjakarta city is better well-educated than other medium-sized cities across country, the environmental issues are supposed to be easier campaigned and implemented by all stakeholders, including the active participation of the universities.

7.4 CONCLUSIONS

In this chapter, local resident perception and expectation were explored by respondent participation in rating the TransJogja service quality referring to the current level of service. This research employs overall measures of service quality by considering different service aspect method to reveal and examine the data. According to the findings, HCSI can be considered as useful tool for measuring transit service quality to oversee transit agency performances and fulfil customer requirements. The index enables the causes generating customer satisfaction/dissatisfaction to be identified and the strategies for improving the service quality to be defined.

HCSI explores heterogeneity into user judgments because importance and satisfaction rates are corrected according to dispersion from the average value. The value of HCSI is 7.22 out of 10. By converting this score into a percentage, the satisfaction index shows that the service is about 72 percent successful in satisfying TransJogja customers.

More efforts are needed to increase the level of customer satisfaction and attract new users to use TransJogja. Both regulator and operator should more initiate corrective measures referring to the user's perspective, more than the government projects in general which are usually top down setting. For example, length of staying on board's attribute is the lowest weighted score (0.05) which is also the least satisfactory service attribute expressed by respondent. Reducing travel time by the application of ITS in advance can be considered as the highest priority measure to tackle the service quality problems more than expanding the service area. Other service attributes that should be considered by both regulator and operator are the follow up of complaint and availability of parking at terminal, respectively. The weighted scores are 0.08 and 0.07, respectively, indicating that they less contribute HCSI value as well as the attributes which are mostly complained by respondents. These things have become evident that the functions, roles and regulatory framework of urban transport are needed to reform in order to overcome the increasingly complicated problems.

CHAPTER 8

SERVICE ATTRIBUTES AFFECTING CUSTOMER SATISFACTION AND LOYALTY (CASE STUDIES: TRANSJOGJA AND TRANSMUSI-INDONESIA)

After measure customer satisfaction index as regards perceived service quality and the satisfaction, this chapter describes the results of factors influencing loyalty to use of new urban bus services after considering service quality delivered, subsidy and fare, and satisfaction aspect. The aim of this chapter is to explore user perceptions of new urban bus service, regarding quality of service, subsidy and fare, satisfaction, and loyalty. The findings from path analysis reveal the important attributes that influence customer satisfaction and loyalty. The model results can be useful both to service providers and transport authorities to analyze the correlation between individual attributes of the service delivered and identify the more important attributes for improving the provided service.

8.1 BACKGROUND

Trying to suppress the increased motorization in Indonesian cities, particularly motorcycles, the Ministry of Transportation (MoT) enacted a decree No 51 of 2007 promoting pilot cities for land transport improvement. The decree mandates the pilot city candidates to reflect their commitments by providing documents declaring their preparedness in terms of institutional capacity, funding capacity, human resource availability and urban transportation master plan. Moreover, the initiatives gained stronger regulatory support by the enactment of the new Traffic Law No 22 of 2009. The law specifically promotes pro-public transport policy development in the cities. In Article 158, it's explicitly states that the government must ensure the availability of land-based mass transit system to meet urban mobility needs. As the implementation of the law, MoT provides technical assistance to promote new urban transit system in order to gradually replace the old buses and restructure the existing bus routes to create a more efficient urban bus networks.

The MoT funds several fleets, supports some of the infrastructures and the local government is required to allocate resources and subsidies simultaneously to ensure the sustainability of new urban bus system's operation. From the target of twenty pilot cities by 2013, to date, fourteen cities have signed memorandum of understanding with MoT and launched such transit systems, including TransJakarta (the pioneer of the

urban bus reform in Indonesia), TransJogja of Jogjakarta and TransMusi of Palembang are included in it. Fostering public transportation is usually one of the key elements in any such strategy. Urban buses and related road-based public transport play the most important role in most developing world, especially beyond the main corridor which may be served by light rail and suburban trains (GIZ, 2011).

The new bus systems are planned to operate on dedicated lanes. However, to date, only TransJakarta does so, while the others including TransJogja and TransMusi run in mixed traffic due to, among others, technical barriers, such as narrow streets in Jogjakarta and Palembang. The new vehicles are air-conditioned and more fuel-efficient (Euro-II compliant diesel-powered bus) compared to most existing buses. Some fleets use environmentally friendly fuel such as CNG in Palembang. The availability of city gas networks and CNG stations remains the major limitation in expanding the deployment of CNG buses.

It is inevitable that one important aspect influencing the sustainability of new urban buses is service quality performance. Therefore, referring to Kersten (2010), it is necessary to determine whether their customers were satisfied. Information gathered from the user is important in evaluating service performance, as the exclusion of customers from improvement efforts to date has created difficulties (Schaffer, 1995). Hence, the measurement of customer perceptions of urban bus performance and policy can reveal problems and priorities and how the urban population actually perceives the issues (Winder, 2005). Moreover, the notion of customer satisfaction is important because satisfying current users is a way to retain them and to attract potential customers. Fornell (1992) found that improving market share and improving customer satisfaction individually results in higher profitability.

8.2 DATA COLLECTION

In this research, the sample surveys were addressed to both TransJogja and TransMusi passengers who used these new urban bus services as a daily transport mode. As a city of tourism, education and culture, population of Jogjakarta is 510,108 with a density 15,695 people/km2, while Palembang, whose growth relied on natural resources is higher more than three times (1,708,413) but with a density only 4,765 people/km2 (2013). Both Jogjakarta and Palembang started to operate a new transit system in 2008 and 2010, respectively. Daily ridership of TransJogja and TransMusi is about 16,000 and 22,000 passengers, respectively (2013).

A single transit agency manages the urban bus in each city. They are the Jogja Tugu Trans Limited in Jogjakarta and the Sarana Pembangunan Palembang Jaya

Limited in Palembang. Generally, the service is available from 6 am to 21 or 22 pm but a service frequency is delivering without timetable. Buses operate on the same street network as other traffic; frequency depends on the level of congestion on a specific route. Buses can operate as frequently as every 10 minutes during peak hours to once an hour, and vary by time of day. During off-peak times, there is less frequency than during peak hours.

The field surveys, conducted in June to July 2014, were addressed to Trans bus passengers who use the Jogjakarta's TransJogja and Palembang's TransMusi services. A team of surveyors distributed questionnaire on-board and then surveyors approach passengers personally to ask them to fill the questionnaire. The personal approaches in the survey process could be shown by the willingness of surveyors to guide respondents when completing the questionnaires, up to explaining questions to them in cases where respondents could not understand the meaning of certain words, particularly subsidy and fare aspects.

Since it took approximately 20 minutes to fill out the form, this survey did not collect perceptions from short trip users. On average, the success rate of gathering respondents willing to complete the questionnaire was about 73 percent in Jogjakarta and 71 percent in Palembang. This percentage was based on the number of efforts that surveyors made to ask passengers and the number of passengers who fulfilled in the questionnaire. The percentage of success was high enough, and is evidenced by the large number of respondents who asked the surveyors about the follow up to this questionnaire. Some of the respondents also questioned the sustainability of Trans bus operation while the others made a statement about their hope for better service including the uncertainty of new urban public bus in providing real-time arrival information for bus riders.

8.2.1 Descriptive Statistics

Of the 265 questionnaires returned by TransJogja users, only 242 questionnaires could be used for further analysis, while of the 370 questionnaires returned by TransMusi users, only 334 questionnaires could be used in the next stages of the model analysis. The descriptive statistics of the respondents are reported in **Table 8-1**. As shown in the table below, more than a half of Trans users of both Jogjakarta and Palembang cities are students. Another striking characteristic of respondent is the age of the majority of users is under 40 years old and single status. The possible impact of this high percentage of the subsample is that perception of students and young users possibly dominates the perception of the users as a whole.

Table 8-1 Socio-economic characteristics of respondents

	Characteristics	TransJogja's users (n= 242)	TransMusi's users (n= 334)
1.	Sex	Male (48%); Female (52%)	Male (56%); Female (44%)
2.	Marital status	Married (34%); Single (66%)	Married (38%); Single (62%)
3.	Age	≤20 (42%); 21-30 (30%); 31-40 (21%); >40 (7%)	≤20 (39%); 21-30 (33%); 31-40 (24%); >40 (4%)
4.	Place of living	Municipality area (62%); Outside the municipality (38%)	Municipality area (74%); Outside the municipality (26%)
5.	Family members	1 (11%); 2 (16%); ≥3 (73%)	1 (14%); 2 (19%); ≥3 (67%)
6.	Job	Student (60%); civil servant (15%); private employee (16%); entrepreneur (6%); others (3%)	Student (51%); civil servant (22%); private employee (20%); entrepreneur (3%); others (4%)
7.	Education	Junior high school or less (16%); Senior high school (48%); Diploma or higher (36%)	Junior high school or less (15%); Senior high school (56%); Diploma or higher (29%)
8.	Income (IDR)	<1 million (41%); 1-2.5 million (39%); 2.5-5 million (12%); >5 million (8%)	<1 million (43%); 1-2.5 million (35%); 2.5-5 million (9%); >5 million (13%)
9.	Motorized vehicle ownership	Did not own any car (37%); motorcycle (48%); automobile (15%)	Did not own any car (29%); motorcycle (52%); automobile (19%)
10.	The reason for using Trans buses	Did not own any car (35%); prefer to make use of new transit (49%); unable to drive (16%)	Did not own any car (28%); prefer to make use of new transit (51%); unable to drive (21%)
11.	Trip purpose	School/university (57%); work (27%); recreation (10%); social activity (4%); others (2%)	School/university (48%); work (35%); recreation (8%); social activity (6%); others (3%)
12.	The way to reach bus stop	Walking (78%); park and ride (4%); others (18%)	Walking (81%); park and ride (2%); others (17%)
13.	Number of trip using Trans bus per day	Once (31%); twice (48%); three time or more (21%)	Once (38%); twice (43%); three time or more (19%)
14.	Overall satisfaction	Very dissatisfied (9%); dissatisfied (18%); neutral (43%); satisfied (21%); very satisfied (9%)	Very dissatisfied (13%); dissatisfied (14%); neutral (39%); satisfied (29%); very satisfied (5%)

Furthermore, the women constitute as the largest portion of TransJogja user, while the males are the primary user of TransMusi. Nearly 40 percent of TransJogja users residing

outside the municipality indicate nearly half of the traveler to travel across the region. At the same time, the proportion is 26 percent in Palembang. These percentages potentially continue to grow, since the population of both cities is increasing. In terms of income, about 80 percent of Trans users are from lower-class households and about 10 percent are from the wealthiest class.

8.2.2 Attribute and hypotheses

Based on the literature review, the attributes of service quality were selected and formulated for exploring user satisfaction, categorizing quality of service into four factors with each factor having three attributes. **Table 8-2** presents the factors and their attributes which are probably similar to any other measurement conducted by other researchers. However, this research argues that a specific attribute formulated for measuring the performance of new urban bus service in developing countries such as Indonesia exists, particularly subsidy related attributes. In order to make transport more affordable, subsidies are implemented by the local governments of Jogjakarta and Palembang. If more people use urban bus service and become comfortable with that service then they will be more loyalty to use it to go destinations where other modes do not go. This would benefit the city, and community in many ways.

Table 8-2 Factors and attributes of Trans bus

Factors	Attributes
1. Service quality (Q)	• Frequency and reliability (X1) • Safety and security (X2) • Customer service and information availability (X3)
2. Subsidy and fare (C)	• Affordability of fare (X4) • Effect of subsidization (X5) • Distribution of subsidies (X6)
3.Satisfaction (S)	• Satisfaction with overall services (Y4) • Satisfaction with comfort (Y5) • Satisfaction with helpfulness of personnel (Y6)
4. Loyalty (L)	• Loyalty to use if service quality improved (Y1) • Loyalty to use if the overall services satisfy (Y2) • Consider/return to use if the fares affordable (Y3)

Hence, we can deduce some hypotheses to test using structural equation modeling, e.g.:

H1: service quality is positively correlated to fare subsidy

H2: service quality is positively related to future loyalty

H3: service quality is positively related to satisfaction

H4: satisfaction is positively related to future loyalty

It is also seems logical to test the relationship between sustainable source of subsidy and affordable fare which hypothetically influence the characteristics of the service quality by explaining their dependence on the mode:

H5: subsidy and affordable fare are positively related to satisfaction

H6: subsidy and affordable fare are positively related to future loyalty.

8.3 FACTOR LOADING

In this paper, path analysis was employed to reveal the relationship among variables. The model was calibrated using AMOS 22 package from SmallWaters Corporation (Arbuckle and Wothke, 1995). Model results of TransJogja users and TransMusi users are shown in **Table 8-3** and **Figures 8-1** and **8-2**. More specifically, the standardized factor loading estimates, some tests on the goodness of fit and the level of statistical significance of each variable are reported in **Table 8-3**.

To estimate the model, the constriction of a determinant to a value equal to 1 was necessary. Subsequently, the estimated coefficients were standardized. With exception of one parameter in the TransJogja and two determinants in the TransMusi models show negative value, all determinants have correct sign and assume a value statistically different from zero, at quite good level of significance. Only four determinants in the TransJogja and TransMusi models are statistically less significant than the others (level of significance of 10%).

The minimum value of the discrepancy function in TransJogja and TransMusi models are 64.055 and 9.555 (**Figures 8-1** and **8-2**), indicating that they are statistically significant according to the chi-square test. The values of GFI, AGFI, NFI, IFI, and CFI for the TransJogja model are 0.957, 0.932, 0.963, 0.991, and 0.991, respectively, close to unity, meaning that the model is a perfect fit. Based on this result, it is clear that the TransJogja model has a good fitness, since all the parameters obtained imply a good fit model. On the other hand, the values of GFI, AGFI, NFI, IFI, and CFI for the TransMusi model are 0.993, 0.983, 0.985, 1.009, and 1.000, respectively. Some of the parameter fit values of the TransMusi model exceed one, implying a marginal fit model.

As can be seen in **Table 8-3**, only two from six determinants of service quality and none from five determinants of subsidy and fare, are significant at 5 percent in the TransJogja model, while three from six determinants of service quality and one from five determinants of subsidy and fare, are significant at 5 percent in the TransMusi model.

Table 8-3 Standardized factor loading estimates

Latent variables or factors	Observed variables	Structural relationship/Co-relationship	Standardized estimates-Significance level	
			TransJogja	TransMusi
Service quality	Frequency and reliability	Service quality → Satisfaction	0.247**	-0.084**
	Safety and security	Service quality → Loyalty	-0.213**	0.016**
	Customer service & information availability	Service quality → Frequency and reliability	0.652*	0.822*
		Service quality → Safety and security	0.784***	0.834***
		Service quality → Customer service & information availability	0.764***	0.514***
		Service quality ↔ Subsidy and fare	0.881***	-0.091**
Subsidy and fare	Affordability of fare	Subsidy and fare → Satisfaction	0.651***	0.004**
	Effect of subsidization	Subsidy and fare → loyalty	0.930***	0.392***
	Distribution of subsidies	Subsidy and fare → Affordability of fare	0.734*	--
		Subsidy and fare → Effect of subsidization	0.708***	0.641***
		Subsidy and fare → Distribution of subsidies	0.833***	0.954*
Satisfaction	Satisfaction with overall services	Satisfaction → Loyalty	0.226**	0.002**
	Satisfaction with comfort	Satisfaction → Satisfaction with comfort	0.873***	--
	Satisfaction with helpfulness of personnel	Satisfaction → Satisfaction with helpfulness of personnel	0.816***	--
		Satisfaction→ Satisfaction with overall services	0.832*	0.996*
Loyalty	Loyalty to use if service quality improved	Loyalty → Loyalty to use if service quality improved	0.799*	0.793*
	Loyalty to use if the service satisfy	Loyalty → Loyalty to use if the services satisfy	0.695***	0.725***
	Loyalty to use if the fare is affordable	Loyalty → Loyalty to use if the fare is affordable	0.779***	--
Indices of goodness-of-fit parameters				
Chi-square/DF			1.307	0.637
CFI			0.991	1.000
NFI			0.963	0.985
IFI			0.991	1.009
GFI			0.957	0.993
AGFI			0.932	0.983

Note: ***significant at 1%; **significant at 5%; *significant at 10%

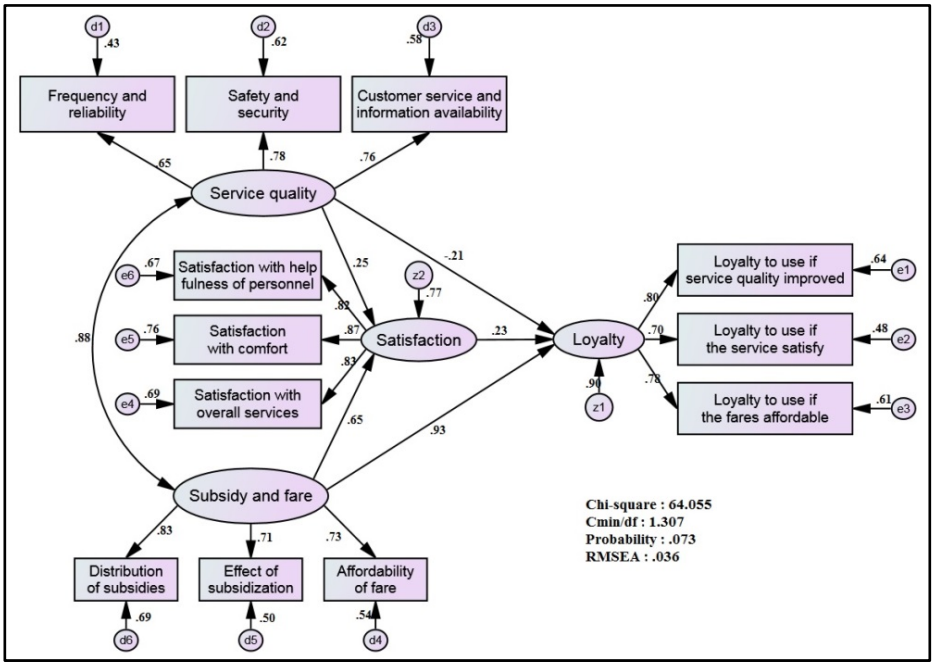


Figure 8-1 Relationship among variables of TransJogja model

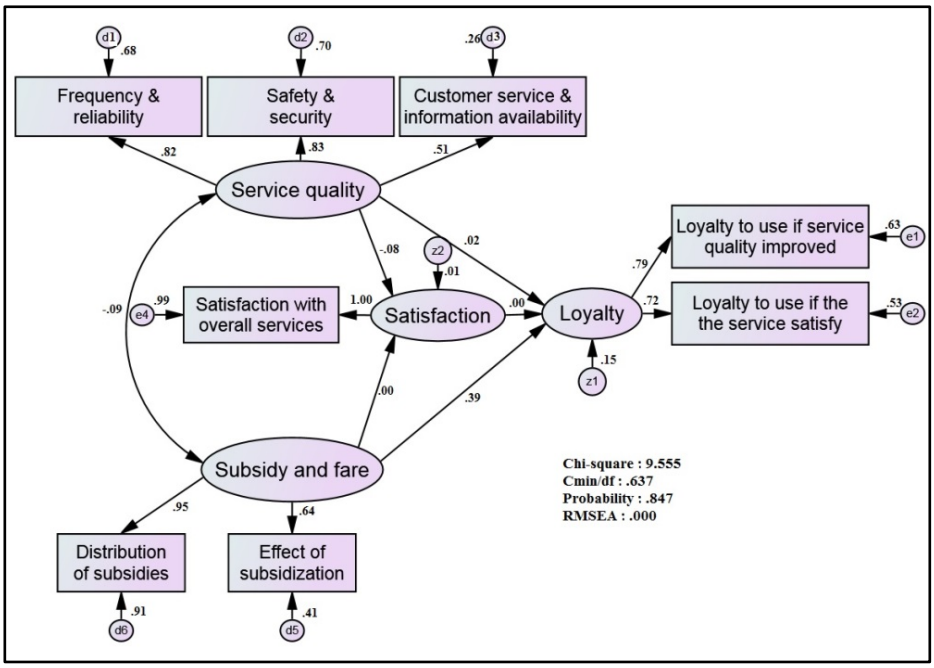


Figure 8-2 Relationship among variables of TransMusi model

Further, only one from four determinants of satisfaction is significant at 5 percent in the TransJogja model as well as in TransMusi model. Three from six determinants of service quality and four from five determinants of subsidy and fare, are significant at 1 percent in the TransJogja model, while two from six determinants of service quality and two from five determinants of subsidy and fare, are significant at1 percent in the TransMusi model.

Moreover, two from four determinants of satisfaction and two from three determinants of loyalty, are significant at 1 percent in the TransJogja model, while none from four determinants of satisfaction and one from three determinants of loyalty, is significant at 1 percent in the TransMusi model. Referring to the standardized regression weights in **Table 8-3**, it is clear that all latent variables of service quality, subsidy and fare, satisfaction, and loyalty are valid (values greater than 0.5) in the TransJogja model. Meanwhile in the TransMusi model, a number of observed latent variable except in service quality had to be removed since their regression weight values are less than 0.5.

According to the level of significance and regression weight, the safety and security (0.784/0.834), and customer service and information availability (0.764/0.514) are the two most important attributes for improving the quality of service of TransJogja as well as TransMusi models, in addition to the subsidy and fare (0.881) attribute in TransJogja model alone. In regards to subsidy and fare policy, the distribution of subsidies (0.833), and effect of subsidization (0.708) attributes are the two most willing to pay attention the local government in the TransJogja model, while the effect of subsidization (0.641) attribute is the one with the highest priority in the TransMusi model which could lead to increase the effectiveness of transport subsidies.

In terms of satisfaction, the satisfaction with comfort (0.873), and satisfaction with helpfulness of personnel (0.816) attributes are the two most recommended aspects for the improvement of customer satisfaction in the TransJogja model, as well as loyalty to use if the fare is affordable (0.779), and loyalty to use if the services is satisfactory (0.695) attributes, which are necessary elements for maintaining customer loyalty. Additionally, loyalty to use if the service is satisfactory (0.725) attribute is the one with the highest priority element for maintaining customer loyalty in the TransMusi model. As shown in **Table 8-3**, the estimated coefficient of satisfaction from service quality is smaller than that of satisfaction from subsidy and fare as well as coefficient of loyalty from satisfaction than that of loyalty from subsidy and fare. These results indicate that the transport subsidies and permanently available in case study cities are the most important measures for maintaining customer satisfaction and loyalty rather than efforts to improve the quality of service and satisfaction as well. Since the funding for urban

bus subsidies are provided from a public budget, bus subsidy and it political support plays a crucial role in supporting new urban bus services.

There are three hypotheses in TransJogja model and one hypothesis in TransMusi model with all regression weights significant at 1 percent. Other hypotheses are less statistically significant (level of significance 5%). The first hypothesis, which positively correlates quality of service with subsidy and fare, is statistically significant, supported by the positive value (TransJogja model). This implies that the higher the quality of service, more subsidies is required, or vice versa, the higher the subsidy level, higher quality of service could be provided. This result looks natural and reasonable.

The second hypothesis, regarding positive relationship between subsidy and fare, and loyalty, is also statistically supported (TransJogja and TransMusi models). It stands to reason that the higher the subsidy, the more loyal the users are likely to be. The third hypothesis, the relationship between subsidy and fare, and satisfaction, is also statistically supported (TransJogja model). This implies that higher amount of subsidy shall also increase TransJogja users' satisfaction.

The fourth hypothesis, the relationship between service quality and satisfaction (TransJogja model), the fifth, the relationship between service quality and loyalty (TransMusi model), and the sixth, the relationship between satisfaction and loyalty (TransJogja and TransMusi models) all have positive values but are statistically less significant. These show that the higher the quality of service provided does not directly increase user satisfaction and loyalty, as well as the increase users' satisfaction does not directly increase user loyalty, since both satisfaction and loyalty are influenced by other aspects and possibly causing valuable information to be left out. The seventh hypothesis, the co-relationship between service quality and subsidy and fare (TransMusi model), the eighth, the relationship between service quality and satisfaction (TransMusi model), and the ninth, the relationship between service quality and loyalty (TransJogja model) were confirmed by less significant negative values. Additionally, the models show that the service quality construct influences loyalty (-0.213) more strongly than it does to subsidy and fare (-0.091), and also satisfaction (-0.084).

The last three hypotheses support the finding that Trans bus users do not perceive loyalty, subsidy and fare, and satisfaction independently. In facts, dependence on Trans bus influences users' perceptions of loyalty, subsidy and fare, and satisfaction to the mode. In this study the service quality delivered represents the dependence on Trans bus. It is understandable that even with low quality of service provided and distribution of transport subsidies is not well-targeted, the users tend more readily to perceive the available service as satisfactory and to show more loyalty to it, as long as it

is able to fulfill their mobility needs. These last three hypotheses differentiate user characteristics in developed countries from those in developing countries.

8.4 CONCLUSIONS

In this paper, authors examine passenger perception which was expressed by Trans bus user participation in rating the new mode's condition, including service quality, satisfaction and loyalty. Authors try to explore more deeply with regard to the effects of subsidy and fare of latent variable, since both operators of TransJogja and TransMusi receive a direct transfer from the local government to keep fares low. The distribution of questionnaire to TransJogja and TransMusi passengers took places in Jogjakarta and Palembang, Indonesia. These cities have been chosen because these are the most populated areas and the most rapid growth of Trans bus systems, respectively. They are also of comparable size in terms of urban bus system operations and data is available on the local level in both selected cities.

This research employs the path analysis to reveal the relationship between customer loyalty on new urban bus services and variables of the services quality. Even when SEM methodology is well known and widely applied in several fields of research, currently there are not so many practical applications in urban public transport, especially for measuring customer satisfaction and loyalty. In this research authors have applied this methodology on the basis of levels of service, levels of satisfaction, and affordability expressed by customers of the Trans bus services. The model results identify service quality, subsidy and fare, and satisfaction attributes to improve, with the aim of offering new urban bus services characterized by higher levels of service delivered.

Selected cities are analyzed, drawn, and compared, to develop a customized measure of customer satisfaction and loyalty of new urban bus services. However, as clearly shown in **Table 8-3**, and also **Figures 8-1** and **8-2**, the different results have been achieved; their diversities are probably due to differing regional policies, designing a way out for improving urban transport services on the city/provincial levels, and socio-economic characteristics of respondents. In other words, because each city has its own unique social and cultural characteristics, lessons learned or model developed from one community in one region/city are not transferable to the other. Success in implementation of any measure depends on local circumstances.

This chapter got in some cases, unexpected results which I thought should be investigated. As positive results are more likely to lead to prestigious publications, discarding odd and unexpected findings is common in the scientific publishing system

that privileges these “successful” results. Traditionally, it is expected that successful studies will obtain research findings in alignment with well-established literature or expected outcomes. However, are negative results indeed meaningless? A "good fit" is not the same as strength of relationship: one could have perfect fit when all variables in the model were totally uncorrelated, as long as the researcher does not instruct the SEM software to constrain the variances. In fact, the lower the correlations stipulated in the model, the easier it is to find "good fit." The stronger the correlations, the more power SEM has to detect an incorrect model. When correlations are low, the researcher may lack the power to reject the model at hand. Also, all measures overestimate goodness of fit for small samples (<200). However, RMSEA and CFI are less sensitive to sample size than others (Fan, Thompson, and Wang, 1999). A good fit doesn't mean each particular part of the model fits well. Many equivalent and alternative models may yield as good a fit -that is, fit indexes rule out bad models but do not prove good models. Also, a good fit doesn't imply causality.

In the model, the relationship between service quality and loyalty was confirmed by less significant negative value (significant at 5%). The model results support the finding that urban bus users do not perceive loyalty independently; in facts dependence on urban bus service influences users’ perceptions of loyalty to the mode. In this study the service quality delivered represents the dependence on urban bus.

CHAPTER 9

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This dissertation mainly aims to evaluate service performance of urban bus projects from viewpoints of service provider, transport authority and customer. This chapter concludes this research, and suggests the implications of findings for Indonesia medium-sized cities as well as cities of other developing countries. At the end, recommendations have been made for further research relevant to the scope of this study.

9.1 SUMMARY OF FINDINGS

Every city in Indonesian is different in terms of the spatial, ecological, economic, and political settings that impact how people access and use urban public transport. The three cities considered in this study have a variation in terms of their size, economy, and regulatory environment. This means urban public transport carries people for different distances, serves unique markets, and operates within varying legal constraints. What is common to the three cities are two key factors that influence the demand for urban public transportation and how needs are met.

First of all, migration to cities is increasing demand, but the scale of migration that has occurred in Indonesia's big cities has not yet reached Bandar Lampung, Palembang and Jogjakarta. And second, decentralization of urban management from national government to provincials and municipalities is increasingly placing responsibility for transportation on the shoulders of local leaders. However, local governments do not necessarily yet have capacity to manage these large scale systems. This study found that where there is political will to introduce new technology such as bus rapid transit (BRT), often the financial resources to operate and maintain large scale systems is limited and BRT may not even be serving the needs of the low income group. On the other hand, as medium-sized Indonesian cities today become more prosperous, the demand for mobility among the urban community is rapidly growing. This is no where more the case than in Jakarta and other big cities, but also in medium-sized cities –each day city streets become frozen with congestion. In order to deal with the increasing transport problems faced in Indonesian cities, the MoT and few local governments is pleased to introduce the new Trans bus system. However, the facts are clearly shows that, government efforts to supply public transportation through MoT's land transport improvement projects are insufficient at best.

Hence, it is essential to evaluate urban bus service performance based on the point of views of the service provider, transport authority, and customer as well that should address critical issues for improvement of service quality performance towards the achievement of sustainable development (**Figures 9-1** and **9-2**).

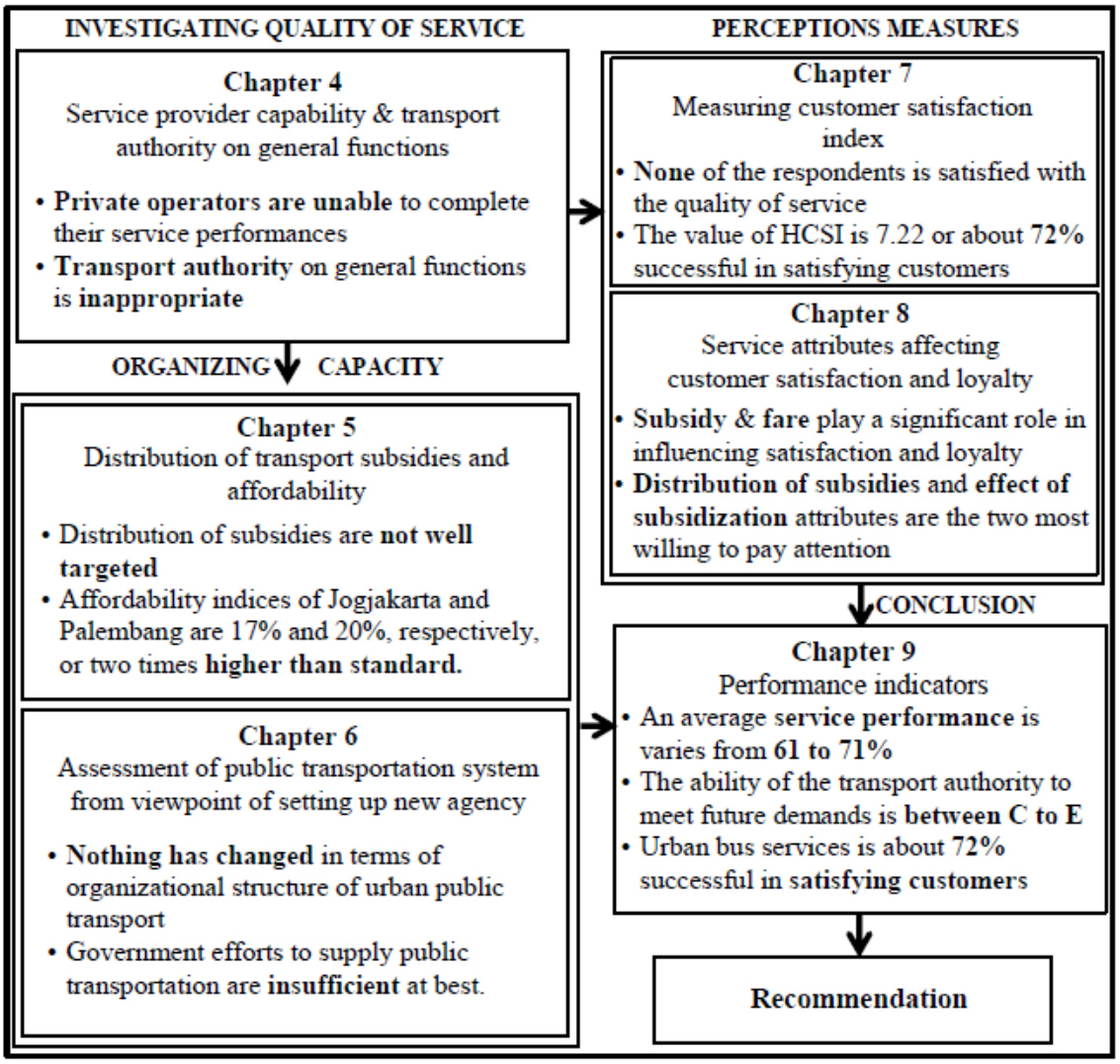


Figure 9-1 The interrelated findings of service quality measuring in each chapter

Therefore, this research is conducted to investigate and analyze the performance indicators that influence the overall service quality of Trans buses in three case study cities such as Bandar Lampung, Palembang, and Jogjakarta.

The main objectives of this research are to examine the organizational capability of service providers to deliver urban bus services, to investigate what are the roles and responsibilities of transport authority to ensure that fulfilled the obligation to

provide basic services, and to measure the consumer opinion on the quality of service. Several city and provincial transport authorities, and local researchers are interviewed in order to understand existing transport usage, institutional and other applied aspects concerning the regulations.

The originality of the methodological approach adopted for this research is given by the integrated assessment of three main actors in managing urban transport systems and covering the historic cores of the three cities of Jogjakarta, Palembang and Lampung which have a variation in terms of their size, economy, and regulatory environment.

9.1.1 Service providers (TransJogja and TransLampung)

Both operators have a low cost recovery ratio; the figures are 31.1% and 29.8%, respectively, as many public transport operators in developing cities. Weak profitability is often a major problem that can leads to loss of income and inadequate funds to sustain the operation. Further, load factors are slightly low: 61.6% average in Jogjakarta and 46.1% average in Bandar Lampung indicated new urban buses less attractive than other modes of transport.

In terms of staff productivity indicators the staff-per-vehicle ratio is a useful measure of the effective use of staff particularly when making comparisons between different operators. Not surprisingly number of personnel working in buses per total number of buses in both case study cities is excessive particularly in most of developing cities where wage levels are low and therefore many tasks may be undertaken using more labor-intensive methods. The fact clearly shows that private operators of urban buses are unable to complete their service performance for which they have been contracted or assigned.

9.1.2 Transport authority on general functions (Jogja and Lampung)

The first form involves government primarily discharging its regulatory role of ensuring that services are safe and affordable, while in the second, it takes on a more active role, by determining the kind of public transport service that should be available and contracting for such services, including through subsidies if necessary. TransJogja urban buses are available from 6:00 a.m. to 21:00 p.m. or level C, while TransLampung urban buses are only available from 6:00 a.m. to 18:00 p.m. or level D. Average speed range from 15 to 16 km/hour or level C due to weather and traffic conditions. Furthermore, travel time would be unpredictable and urban bus service is less reliable.

Irregular and unpredictable service frequencies make a bus service less

attractive. Based on the results obtained, frequency varies but on average a bus comes every 43 (TransJogja) to 49 minutes (TransLampung). In urban area, a walk of 500 meters or less to or from nearest bus stop is normally regarded as desirable, while a distance greater than this is regarded as inconvenient. An acceptable range for a typical city in a developing country is between 75% and 90%, although to some extent what is achievable is influenced by the road system. Based on analysis results, the average percentages of urban area within 500 meters of urban stop is 68% (TransJogja) and 57% (TransLampung), indicate service coverage within the city is poor or substandard. Moreover, number of buses per 1,000 people in Jogjakarta and Bandar Lampung is low enough compared to standard: by compared with normal standard the figures are 32.9% and 11.8%, respectively.

An appropriate fares policy is essential to sustain affordable services that meet demand, while providing the operator with an adequate return on investment. An affordability index could be defined as the fare expenditure as a percentage of income. In developing countries, a reasonable level of household expenditure on bus travel should not exceed 10 percent of household income, while in developed countries, households without cars may spend in the region of 3-5 percent of their incomes on commuting. However, affordability indices in both case study cities are also quite high. They are 17% (Jogjakarta) and 20% (Bandar Lampung), respectively, or two times higher than standard.

9.1.3 Roles and responsibilities of transport authorities (Jogja and Palembang)

Both TransJogja and TransMusi bus system are included among the more than twenty of transit system launched until early of 2014 by the MoT. Nothing has changed in terms of the organization of urban public transport in almost all cities, except Jakarta (TransJakarta). It this assumed that a new urban bus system is a routine matter which is run like regular bus or para-transit. Typically, some employees are placed in a small unit, called a technical implementation unit. Generally, at provincial or city levels of government of Indonesia, local transportation offices are only responsible for transport policy and service planning. Other functions such as strategic planning, fare setting, driver license, are conducted by other agencies. The ability to undertake comprehensive planning and execution that is integrated functionally, spatially, sectorally, and hierarchically is too often constrained because of the highly fragmented governance of urban transport in most cities. Although many cities are attempting to establish effective urban transport authorities that encompass multiple jurisdictions, functions, and modes, only a few have succeeded. These latter institutions such as LTA of Singapore and MTA

of Seoul evolved over a number of years, encountering challenges and lessons from which others include Jogjakarta and Palembang, can benefit.

9.1.4 Customer satisfaction index (TransJogja)

Passenger judgments on perceived quality show that the only 7 of 27 service attributes are considered somewhat satisfied with the transit service as they are practically represented by an average satisfaction score close to or higher than 7.0. The attributes with the highest average satisfaction scores are safety against crimes on buses (7.91), security at the bus stops while waiting for the bus (7.82), availability of shelter and benches at bus stop (7.61), ticket cost (7.48), ease of payment (7.35), vehicle reliability and competence of drivers (7.07), and availability of map/route at bus stops (7.06). Furthermore, there is no an average satisfaction score close to or higher than 8.0 indicate that none of the respondents is satisfied with the quality of service provided by the operator. Overall, the value of HCSI is 7.22 out of 10. By converting this score into a percentage, the satisfaction index shows that the service is about 72 percent successful in satisfying TransJogja customers.

9.1.5 Service attributes affecting customer satisfaction and loyalty

Subsidy and fare play a significant role in influencing both satisfaction and loyalty of TransJogja users rather than service quality aspect while service quality and subsidy and fare are excluded in determining of satisfaction of TransMusi users as well as service quality and satisfaction in determining of loyalty. According to the level of significance and regression weight, the safety and security (0.784/0.834), and customer service and information availability (0.764/0.514) are the two most important attributes for improving the quality of service of TransJogja as well as TransMusi models, in addition to the subsidy and fare (0.881) attribute in TransJogja model alone. In regards to subsidy and fare policy, the distribution of subsidies (0.833), and effect of subsidization (0.708) attributes are the two most willing to pay attention the local government in the TransJogja model, while the effect of subsidization (0.641) attribute is the one with the highest priority in the TransMusi model which could lead to increase the effectiveness of transport subsidies.

9.1.6 Performance indicators

Hence, the performance indicators for urban bus service quality, including the service availability, organizing capacity and customer satisfaction are presented in **Figure 9-2**.

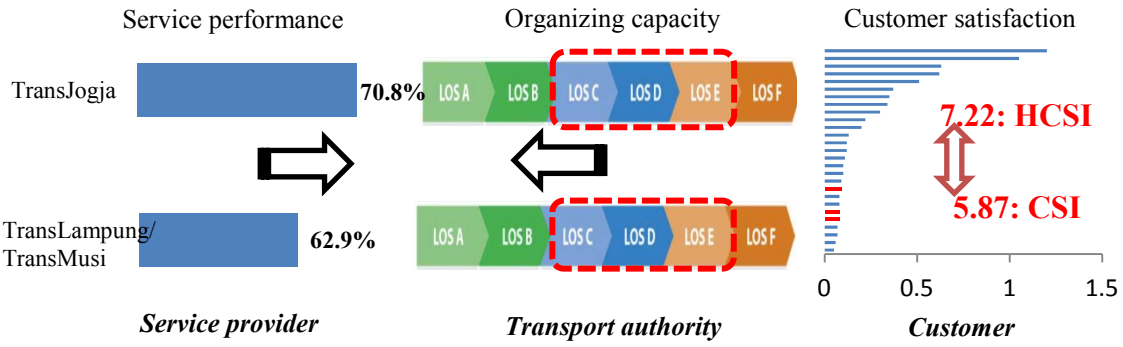


Figure 9-2 Performance indicators of urban bus services

Several key findings from the study reveal that:

- New urban bus offers significant bus performance benefits
  - ✓ Faster travel times than conventional bus
  - ✓ More reliable wait times
  - ✓ More comfortable service
  - ✓ Reverse trend toward declining bus mode share
- Improved performance of urban bus service could essentially contribute to improve environment in medium cities by shifting mobility from private mode of transport towards more efficient environmental friendly and safe travel modes

But more efforts are needed to enhance the capacity of local government and guiding the operators to maximize efficiency and to further enhance service performances as well.

9.2 POLICY DEVELOPMENT

This finding looks at new urban bus projects from different point of views of service provider, transport authority and customer, and reconsiders its value not just in improving urban mobility, but also as a sign of city modernization and presence of government in the public service. In doing so, this report describes how new urban bus improves mobility in cities by complementing other formal and informal transportation modes, but the government efforts, both central and local governments, to supply public transportation through MoT's land transport improvement projects are insufficient at best. Therefore, two main policies and strategies level can be summarized as follow

1. Strengthening capabilities of service providers

The findings clearly show that both public and private operators of urban buses

in case study cities are unable to complete their service performance for which they have been contracted or assigned. Hence, the resources employed in bus services should be put to the most productive and efficient use. For this purpose there is a need to evaluate the operational performance of bus services regularly as well as the standard of service being provided to users. Monitoring should be based on data that can be relatively easily obtained without relying too much on data submitted by operators.

To improve their efficiency and competitiveness, government would have to embark in several policy changes. First, the existence and function of city bus terminals have to be reviewed. Local governments have long misappropriated terminals as the source of revenues that are originally built as point of transfer. As a result, thousands of small and large buses include Trans bus, have been illogically forced to enter terminals, creating excessive, unnecessary delay and congestion to the surrounding street networks. Second, there must be a policy reform in the way the city government providing route permits and licensing, including the abolition of red-tape bureaucracy and other misconduct. The current ill-fated procedure has caused an excessive numbers of paratransit and small buses operating on the city streets. Third, any possible effort should be looked at to assist the operators with a financial scheme in the procurement of new buses and spare parts, for example through credit programs and cooperatives, or through some sort of tax incentives.

2. Establishing effective lead institutions

It is inevitable that the need for institutional coordination across space and function is increasingly being recognized as critical to developing an integrated and comprehensive urban transport system. Typically responsibilities for urban transportation cut across local, provincial, and national levels of government. At each level, moreover, different agencies license and regulate bus operators; build and maintain roads, railways, bus lanes, terminals, and related facilities; control traffic lights and rules; and enforce rules. A few cities across countries have been successful in establishing effective lead institutions for the management and delivery of urban transport infrastructure and services such as LTA (Singapore) and MTA (Seoul) from which others city can benefit.

Further, government agencies in case study cities have no capability to undertake systematic network planning. Typically, initiatives for route changes arise from customer complaints, through political channels or from the operators. Gaps may be filled incrementally by a route extension or, less commonly, by a new route. Therefore, a continuous network planning process of high professional standard is

required in order that the needs of the citizens are matched with appropriate transport services. On the other hand, many network studies have been conducted, as proposed for TransJogja, but the benefits were never realized because of the constraints on implementation often deriving from an inadequate regulatory framework, and low institutional capability.

9.3 IMPLICATION FOR DEVELOPING COUNTRIES

Some implications for cities of developing countries are suggested despite differences in local circumstances among countries. Empirically, BRT or like is being implemented in different forms in different parts across countries, and operates within varying legal constraints. The research findings could provide valuable ideas to measure and evaluate the performance of the transport system, regularly, from the point of view of service provider, transport authority, and customer as well for sustainable development in developing countries where the mode share of public transport has declined sharply in recent years. The main lesson to be learned from the MoT land transport improvement project of Indonesia is that it is a fundamental principle that the regulatory regime must be appropriate to the structure of the industry. Regulation includes all means whereby an authority directs and influences operators to comply with standards, policies and plans. It may include powers conferred on the authority by legislation, as well as standards, norms and procedures.

Traffic congestion and competition for use of road space is endemic in many cities, which reduces the quality of public transport and encourages more people to shift to private cars and motorcycles. In such cities, some transport operations are subsidized though the distribution of transport subsidies is not well targeted. They have complex urban management problems but lack the resources to deal with them. Available resources are often poorly organized. The core problem is often the lack of a coherent policy, and a lack of political will to deal with controversial transport issues where stakeholders are likely strongly defend their interests.

- ✓ Prior to the review on urban transport strategy, urban transport strategy should be clearly defined. In other words, a strategy comprises a set of long-term policy objectives, or an actionable vision of some 20 years ahead and a set of policy measures that are feasible during the coming 5 to 10 years.
- ✓ Importantly, it also includes a description of how to implement and manage the proposals.
- ✓ In medium-sized cities, policy coordination may be achieved by defining one single public agency to deal with urban, transport and traffic issues.

- ✓ Key achieving success is systematic training on both the social and technical aspects of related policies. Difficulties may also emerge from local financial or technical restrictions.
- ✓ City consortiums may be an alternative, by defining resources to be shared by all, such as planning tools and specialized personnel.

In recent decades, the creation of bus lanes on existing roads (painting of a lane in a different color from the rest of the asphalt) has been a common low-cost strategy for improving the quality of bus systems throughout the world. In some cases, they are shared with high-occupancy vehicles, taxis, and/or non-motorized vehicles, and even with vehicles near turning points. New technologies allow vehicles in bus lanes to gain priority at intersections, with lights automatically turning red for cars and green for buses whenever the later approach shared intersections. Despite their advantages, in developing cities, unsegregated bus lanes alone, particularly those situated in the curb lane, do little to enhance the effectiveness of public transport. Temporary parking by taxis and delivery vehicles, low levels of respect for traffic rules, the unavoidable conflicts with turning vehicles, and limitations in narrow street configurations degrade the usefulness of bus lanes in these contexts. Here, a more effective intervention in favor of public transport is the construction of busways that are physically segregated from other traffic by means of barriers, cones, or other well defined physical features. Located on the curb or in the median of a roadway, they are permanently and exclusively for the use of public transport vehicles although emergency vehicles are often allowed to use the lane.

The relationship between the transport institution and public transport service operators has been evolving. The trend since the 1990s has been to separate the service planning function from actual operations. The rationale for this is that the planning function is performed in the public interest -that is, serving a common public good- while service operations are performed by entities with a commercial interest. Thus, the emerging trend is for a public entity to plan services and then contract them, through a competitive process, to operating companies. The nature of operating companies varies, ranging from private sector, public sector, mixed, and monopolistic to a competitive arrangement. Thus, the size and diversity of the private sector will be a major determinant of the capability and mix of skills required for regulation. The more services entrusted to the private sector, like TransJogja and TransLampung, the more well-defined governments regulatory strategies must be. The task of administering a system of licenses, awarding and regulating private sector contracts, franchises and concessions, and monitoring performance and market conditions requires a fairly

sophisticated legal and administrative framework. Unfortunately, uncoordinated regulation of new urban bus and other transport modes in case study cities has contributed to a decline in ridership as well as service that is available to the low income group.

9.4 FUTURE PROSPECTS

This research has investigated new urban bus service performance from different point of views of service provider, transport authority and customer to understand the relations among actors involved in urban transport management. However, dealing with inadequate and poor service quality of urban public transport problems is very complex. Because of the limited scope of this research, following are the some recommendations for further research related to issues of urban bus service performance in medium-sized cities of Indonesia and cities of other developing countries:

- It is recommended to evaluate service providers of urban bus by using profitability ratios that helpful meet the needs of the enterprise and its key stakeholders in measuring a company's short term debts with its most liquid assets.
- Fares policy is an important, but difficult aspect of regulation due to its social impact and political sensitivity. Public transport policy must address the issue of whether the full cost of providing a bus service should be recovered from passengers' fares or whether any general subsidy, or subsidy of particular groups of users, should be provided. This study also suggests: what makes for a good subsidy scheme?
- The benefits such as social, financial, and environmental associated with the implementation of a specific measure need to mention in a questionnaire survey related to evaluation of customer perception regarding quality of service delivered.
- Further studies should also focus on qualitative approach with large sample size in describing the user perceptions and expectations regarding urban bus service attributes.

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2. Purba, A., Nakamura, F., Tanaka, S., and Wang, R. (2013). Comparison of Affordability Indices and Urban Bus Subsidies in Medium-sized City -Case Study: Jogjakarta and Palembang. Japan Society of Civil Engineers (*Accepted for Journal*).
3. Purba, A., Nakamura, F., Tanaka, S. (2014). An Evaluation of New Transit System from Viewpoint of Institutional Framework (Case Studies: Jogjakarta and Palembang). Proceedings of International Alliance for Sustainable Urbanization and Regeneration (IASUR), October 24-27, 2014, Kashiwa, Japan, pp. 234-243.
4. Purba, A., Nakamura, F., Tanaka, S. (2014). An Assessment of Transport Policy for Tourism city −Case Study: Foreign User Satisfaction of TransJogja. Japan Society of Civil Engineers. (*Under review*)
5. Purba, A., Nakamura, F., Tanaka, S. (2014). Service Delivered on New Transit System from Users Viewpoint (Case Study: TransJogja and TransMusi-Indonesia). Urban Regional and Planning Review. (*Under review*)
6. Purba, A., Nakamura, F., Tanaka, S., Sanit, P., Ariyoshi, R. (2015). Evaluating TransJogja Service Quality based on User Perceptions and Expectations. Proceedings of the 11th International Conference of Eastern Asia Society for Transportation Studies (EASTS) 2015. (*Under review*)

Interview Sheets: Service Providers
(Field Survey I)

PURPOSE OF INTERVIEW

The purpose of this interview is to collect data regarding urban bus transport industry structure and bus service supply characteristics in your city. The collected data is used to evaluate the service performance and management capability of service providers in delivering urban bus services.

Questions

1. *Basic service provider/company information*

Company name	
Company type a. private b. public c. state-owned d. others	
Established year	
Contact person (a) Name (b) Phone No.	

2. *Company management structure and staff functions*

a. Please give the company's organizational structure

b. Staff categories

Staff categories	No. of staff	Average monthly wage rate per employee (IDR)	Salary contract	Working hours per day
Driver				
Conductor				
Other traffic staff				
Maintenance				
Adm & management				
Commissioner				
Director				

3. Operating statistics

a. Please give operating statistics of bus service by your company

Items	2010	2011	2012	2013
Number of licensed vehicle				
Vehicle availability (%)				
Vehicle utilization (%)				
Average daily km per bus				
Passenger per vehicle per day				
Average load factor (%)				
Cost recovery ratio (%)				
Amount of subsidy received				

4. Cost issues

a. What kind of costs for bus services should the service provider/company mainly pay?

Cost categories	2010	2011	2012	2013
Capital cost				
Personnel costs				
Energy costs				
Maintenance costs				
Administration costs				
Other costs				

Interview Sheets: City/Provincial Transport Authorities
(Field Survey II)

PURPOSE OF INTERVIEW

The purpose of this interview is to collect the data regarding the institutional aspects and regulations, and current urban bus transport industry of your city. If possible, I would like to request for any official/unofficial publications and documents on urban bus transportation policy, regulations, and management issues through this interview.

Questions

1. Organization structure and management system

1.1. Organizational structure

a. What is the organizational structure of transport sector for urban bus system?
b. What are the role, responsibilities, and activities of each transport authorities?

1.2. Government policy

a. What is the history of regulation on the urban bus system in your city?
b. What is the government intervention to promote urban bus transport system?
c. If there was urban bus system reformation in your city, how did urban bus transport system reform? And what was the result of reformation?
d. What is the regulation between local government and service providers?
e. How does local government give incentive to service providers to increase efficiency and reduce operation cost?
f. Is there any taxation on bus operators?

1.3. Regulatory body

a. What is the main role of transport authority in urban bus transport industry?
b. What kind of management system do you have in order to control urban bus operation system?

2. Service Providers

a. How many bus operators in your city?
b. Please answer the name, company type, established year, and about their bus service supply characteristics

Service provider	Company type (public, private, state owned)	Established year	Bus service supply characteristics
			Average daily buses in operation: No. of routes: Hours of operation: Fares system: Area of responsibility:
			Average daily buses in operation: No. of routes: Hours of operation: Fares system: Area of responsibility:

3. Regulation of urban bus transport system

3.1. Regulations for starting/changing/withdraw the bus service

a. What is the procedure to enter the market?
b. What kind of system do you have in order to decide for entry of new service providers?
c. Who give the permission of bus operation to the service provider?
d. Which criteria must be considered by the authority to permit the bus operation?
e. What kind of information should the service provider submit to the authority to start the bus service?
f. Must service provider own a new vehicle? Or is it enough for service provider only to have the right to use it?
g. How many are minimum number of bus vehicle should service providers own to start bus business?
h. What facilities must the service provider establish to start bus business such as garage, bus stops, workshop, etc.?
i. What is the process to change its bus service?
j. What is the process to withdraw from the bus operation?
k. What must the service provider submit in changing/withdraw plan to the authority?

3.2.Licensing System

Service Providers

a. What kinds of licenses are needed to start bus operations for service providers?

What is license name?

b. Who gives these licenses?
c. What is the requirement for service providers to get licenses?
d. How long would the license be valid?
e. How much is the license fee?

Drivers

f. Do drivers need to have any special license for bus operation besides a regular driver license? What is the license name?
g. Who gives these licenses?
h. What kind of examination do the drivers have to take to get that license?
i. How long would the license be valid?

3.3. Regulation for bus routes

a. Who or what organization plans the bus routes?
b. What kind of system is applied to determining a new route?
c. Who or what organization determines service providers or give permission to operate in each of service?
d. What is the procedure of giving permissions to the bus routes?
e. What kind of criteria is applied to determining a service provider for a route?
f. Do laws/acts define those criteria? Or are they considered by the authority?
g. Suppose that a service provider was allowed to operate the buses in a route. Can other service providers starts the new bus service on the route?

3.4. Regulation for bus fare

a. Who sets up the bus fares?
b. Is there a regulation on bus fare? If yes, which type of regulation do you have?
c. How is the regulated fare formed?
d. If service provider wants to change the bus fare, then what is the procedure should the service provider do?
e. How do you control fare revenue?
f. Who collects fare and finances of bus operation?
g. Must the service provider submit the annual report including the balance-sheet with the profit and loss accounts to the authorities?

3.5. Regulation for bus service frequency

a. Who plans the bus service frequency?
b. Do you have any regulation on the bus service frequency?
c. Which criteria must be taken to set up bus service frequency?

3.6. *Regulation on bus vehicle*

a. Does the authority have the regulation on the maximum loading capacity, size, and weight of bus vehicles? What are the maximum loading capacity, size, and weight of bus vehicle?
b. Is there any regulation on years of vehicle use? How long are the maximum years of use?
c. Is there any regulation on vehicle type?
d. Is there any regulation on bus speed?
e. Is there any regulation on the overloading of bus service?
f. Is the vehicle inspection required for the service providers?
g. How do you inspect the bus vehicle?
h. How often do the vehicles have to be inspected?

3.7. Regulation on bus related infrastructure

a. Who decides the location of bus stops?
b. Who set/construct the bus stops and bus related infrastructure?
c. Who is responsible for bus stops and bus related infrastructure?
d. Do you have any regulation to decide the location of bus stops, terminals, and garages/depots? If yes, please explain the details about the regulation. (*for example, the interval of bus stops should be in 500 m*).

3.8. Regulation on bus service information

a. What information must the service provider show to the customer?
b. Where does the service provider need to present the information? At office, bus stops, or in-vehicle?

3.9. *Labor management*

a. Who manage service providers, bus vehicles, and drivers?
b. Is there a regulation on working hours of drivers per day or per week?
c. Is there a regulation on driving hours of drivers per day or per week?
d. If bus companies/service providers or drivers break the rules;

- Who give them penalty?
- How will give them penalty?

3.10. Passenger regulation

a. Is there any regulation on passenger behavior? If there is a regulation on passenger behavior, please write the details of prohibited behavior of customers.

4. Financial support

a. Do you have any subsidy/financial support system for bus operation? If yes, please explain it in detail.

b. Who subsidizes for bus operation?

5. Please fulfill these tables

a. Authorities on general functions

Service attribute	TransJogja	TransMusi
Hours of service (from ….a.m. to …p.m.)		
Average travel speed (km/hour)		
Frequency (minutes)		
Percentage of urban area within 500m of bus stop (%)		
Number of buses per 1,000 people		

b. Roles and responsibilities of the authorities

Authorities	Strategic Planning	Transport Policy Planning	Fare Setting	Infrastructure Planning	Service Planning	Driver Licensing/ Vehicle Registration	Traffic Management & Enforcement	Infrastructure Construction & Management	Common Facilities (terminals, bus stops, depots)	Public Transport Operations
Dishub										
Bina Marga										
…										
…										

Interview Sheets: Customers
(Field Survey III)

PURPOSE OF INTERVIEW

The aim of this interview is to collect data and to know your level of satisfaction regarding urban bus services in Jogjakarta and Palembang. Kindly use the five-point scale of evaluation.

Part 1: General Characteristics of Respondents

1. Sex ☐ Male ☐ Female
2. Marital status ☐ Married ☐ Single
3. Age ☐ ≤ 20 ☐ 21- 40 ☐ > 40
4. Place of living ☐ City area ☐ Outside city
5. Family members ☐ ≤2 ☐ 3-4 ☐ > 4
6. Education ☐ Junior high sch. or less ☐ Senior high sch. ☐ Diploma or higher
7. Job ☐ Student ☐ Civil servant ☐ Private sector employee ☐ Entrepreneur ☐ Labor ☐ Housewife ☐ Others
8. Income (IDR) ☐ <1million ☐ 1-2.5 million ☐ 2.5-5 million ☐ >5 million
9. Car ownership ☐ Did not own any car ☐ motorcycle ☐ car
10. Reason for making use of Trans bus ☐ did not own any car ☐ prefer to make use of new transit ☐ unable to drive
11. Trip purpose ☐ school/university ☐ work ☐ social activities ☐ business ☐ shopping ☐ others
12. Number of trips using Trans bu ☐ Once per da ☐ twice per d ☐ three times or more per day
13. The way to reach bus stop ☐ walking ☐ park and ride ☐ un-motorized mode ☐ others
14. Overall satisfaction ☐ very dissatisfied ☐ dissatisfied ☐ neutral ☐ satisfied ☐ very satisfied

Part 2: Factors and attributes of service quality of Trans bus (for SEM model)

(1: very dissatisfied; 2: dissatisfied; 3: neutral; 4: satisfied; 5: very satisfied)

1. Service Quality (Q)

   Frequency and reliability (X1)

   1 2 3 4 5

   Safety and security (X2)

   1 2 3 4 5

   Customer service and information reliability (X3)

   1 2 3 4 5

2. Subsidy and fare (C)

   Affordability of fare (X4)

   1 2 3 4 5

   Effects of subsidization (X5)

   1 2 3 4 5

   Distribution of subsidies (X6)

   1 2 3 4 5

3. Loyalty (L)

   Loyalty to use if service quality improved (Y1)

   1 2 3 4 5

   Loyalty to use if the services satisfy (Y2)

   1 2 3 4 5

   Loyalty to use if the fares affordable (Y3)

   1 2 3 4 5

4. Satisfaction (S)

   Satisfaction with overall services (Y4)

   1 2 3 4 5

   Satisfaction with comfort (Y5)

   1 2 3 4 5

   Satisfaction with helpfulness of personnel (Cu3)

   1 2 3 4 5

Part 3: Factors and attributes of service quality of TransJogja (for the CSI methods)

The aim of this interview is to know your level of ***satisfaction*** and ***importance*** regarding urban bus services in Jogjakarta. Kindly use the ten-point scale of evaluation.

TransJogja Service Quality

Below are some TransJogja service quality attributes.

Please, check the box which most accurately reflects how **satisfied** or **dissatisfied** you are with each item (1 totally dissatisfied, 10 totally satisfied).

[2 very dissatisfied; 3 dissatisfied; 4 somewhat dissatisfied; 5 less dissatisfied; 6 less satisfied; 7 somewhat satisfied; 8 satisfied; 9 very satisfied]

Service quality attribute	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Availability bus stop near home and destination	O	O	O	O	O	O	O	O	O	O
Route characteristics (n. of bus stop, distance between bus stops)	O	O	O	O	O	O	O	O	O	O
Operation hours	O	O	O	O	O	O	O	O	O	O
Service frequency	O	O	O	O	O	O	O	O	O	O
Availability of shelter and benches at bus stop	O	O	O	O	O	O	O	O	O	O
Reliability of buses that come on the specified range	O	O	O	O	O	O	O	O	O	O
Vehicle reliability and competence of drivers	O	O	O	O	O	O	O	O	O	O
Length of staying on board	O	O	O	O	O	O	O	O	O	O
Availability of map/route at bus stops	O	O	O	O	O	O	O	O	O	O
Availability of service information by phone, mail, internet	O	O	O	O	O	O	O	O	O	O
Av. of information on buses regarding bus stops, transfer points	O	O	O	O	O	O	O	O	O	O
The ease to submit complaint, request, opinion	O	O	O	O	O	O	O	O	O	O

Follow up of the complaint, request	O	O	O	O	O	O	O	O	O	O
Availability of parking at terminal and bus stops	O	O	O	O	O	O	O	O	O	O
The ease of payment	O	O	O	O	O	O	O	O	O	O
Quality of air conditioning on bus	O	O	O	O	O	O	O	O	O	O
Cleanliness of interior, seats, and windows	O	O	O	O	O	O	O	O	O	O
Bus overcrowding	O	O	O	O	O	O	O	O	O	O
Safety against crimes on buses	O	O	O	O	O	O	O	O	O	O
Security at the bus stops while waiting for the bus	O	O	O	O	O	O	O	O	O	O
Helpfulness of personnel	O	O	O	O	O	O	O	O	O	O
Ticket cost	O	O	O	O	O	O	O	O	O	O
Level of emission	O	O	O	O	O	O	O	O	O	O
Level of congestion impact	O	O	O	O	O	O	O	O	O	O
Level of road accident caused by TransJogja	O	O	O	O	O	O	O	O	O	O
Level of road deterioration caused by TransJogja	O	O	O	O	O	O	O	O	O	O
Effect of TransJogja to the economic, social, cultural & tourism	O	O	O	O	O	O	O	O	O	O

Now, check the box which most accurately reflects how **important** or **unimportant** the various factors are to you (1 of no important at all, 10 extremely important)

[2 very unimportant; 3 unimportant; 4 somewhat unimportant; 5 less unimportant; 6 less important; 7 somewhat important; 8 important; 9 very important]

Service quality attribute	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Availability bus stop near home and destination	O	O	O	O	O	O	O	O	O	O
Route characteristics (n. of bus stop, distance between bus stops)	O	O	O	O	O	O	O	O	O	O
Operation hours	O	O	O	O	O	O	O	O	O	O
Service frequency	O	O	O	O	O	O	O	O	O	O
Availability of shelter and benches at bus stop	O	O	O	O	O	O	O	O	O	O
Reliability of buses that come on the specified range	O	O	O	O	O	O	O	O	O	O
Vehicle reliability and competence of drivers	O	O	O	O	O	O	O	O	O	O
Length of staying on board	O	O	O	O	O	O	O	O	O	O
Availability of map/route at bus stops	O	O	O	O	O	O	O	O	O	O
Availability of service information by phone, mail, internet	O	O	O	O	O	O	O	O	O	O
Av. of information on buses regarding bus stops, transfer points	O	O	O	O	O	O	O	O	O	O
The ease to submit complaint, request, opinion	O	O	O	O	O	O	O	O	O	O
Follow up of the complaint, request	O	O	O	O	O	O	O	O	O	O
Availability of parking at terminal and bus stops	O	O	O	O	O	O	O	O	O	O
The ease of payment	O	O	O	O	O	O	O	O	O	O
Quality of air conditioning on bus	O	O	O	O	O	O	O	O	O	O
Cleanliness of interior, seats, and windows	O	O	O	O	O	O	O	O	O	O

Bus overcrowding	O	O	O	O	O	O	O	O	O	O
Safety against crimes on buses	O	O	O	O	O	O	O	O	O	O
Security at the bus stops while waiting for the bus	O	O	O	O	O	O	O	O	O	O
Helpfulness of personnel	O	O	O	O	O	O	O	O	O	O
Ticket cost	O	O	O	O	O	O	O	O	O	O
Level of emission	O	O	O	O	O	O	O	O	O	O
Level of congestion impact	O	O	O	O	O	O	O	O	O	O
Level of road accident caused by TransJogja	O	O	O	O	O	O	O	O	O	O
Level of road deterioration caused by TransJogja	O	O	O	O	O	O	O	O	O	O
Effect of TransJogja to the economic, social, cultural & tourism	O	O	O	O	O	O	O	O	O	O