ANISSA S. FEBRINA

Master Thesis

Actors and Technology in the Shaping of Urban Transport Network in Jakarta, Indonesia

Technische Universität Berlin
Urban Management Masters' Programme

Berlin
GERMANY
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STATEMENT OF AUTHENTICITY OF MATERIAL

This thesis contains no material which has been accepted for the award of any other degree or diploma in any institution and to the best of my knowledge and belief, the research contains no material previously published or written by another person, except where due reference has been made in the text of the thesis.

Anissa S. Febrina

9 February 2009

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The time I have spent conducting this research is only a small fragment of the long path that I will continue to take in answering my curiosities about the city I am passionate about: Jakarta. The last six months have been another journey of seeking knowledge, one that ends not by knowing something new, but by being grateful for the process itself.

ABSTRACT

FEBRINA, ANISSA S. Actors and Technology in the Shaping of Urban Transport Network in Jakarta Metropolitan Area. 2009. Thesis (Urban Management Masters' Programme) – TU Berlin, Berlin, 2009

Public transport modernization is taking place in many cities in developing countries. Aside from the challenge of seeking the required investment to provide better accessibility and mobility for city inhabitants, municipalities in those cities are faced with a greater challenge of determining the best mix of modes from the available transportation technology and integrate the already existing network, actors and interests. Indonesia's capital of Jakarta is one such city currently faced with that challenge. While plans for a bus rapid transit system have already been realized, and those for monorail and subway lines are under development / are in their initial stages, the municipality has not been able to integrate old actors and interests into the desired urban transport network. In a way, several larger private bus operators have already been integrated in the new bus rapid transit consortia; many others, however, still resist the offered scenario to perform as feeder service. Rationalization of public transport in Jakarta will directly and indirectly affect many, those acting as providers (individual fleet owners, drivers), supporting actors (fleet assembly garages), consumers (mainly middle to lower class passengers), as well as rent-seekers who are currently fed by the way public transport and paratransit operates in the city. Transportation studies in Jakarta have evaluated and come up with strategies as to how to realize bus rapid transit, monorail and subway, but the issue of rationalization of the current public transport remains a neglected – if not avoided – one. Rationalization should involve a deep understanding on how the current urban transport network came into being. For this, the study aims at taking the very first step in understanding the problem by analyzing how actors and technology are shaping Jakarta's urban transport network.

Keywords: Urban Transport, Jakarta, Actor-Network, Technology

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LIST OF ABBREVIATIONS

BRT	Bus Rapid Transit
BPS	Biro Pusat Statistik (Central Statistic Bureau)
Bappenas	Badan Perencanaan Pembangunan Nasional (National Planning Board)
CTS-UI	Center for Transportation Studies – Universitas Indonesia
DKI	Daerah Khusus Ibukota (Jakarta Special Province)
Dephub	Departemen Perhubungan (Ministry of Transportation)
Dishub	Dinas Perhubungan (Jakarta Transportation Agency)
GDP	Gross Domestic Product
GTZ	Gesselschaft für Technische Zussamenarbeit (German Technical Cooperation Agency)
IDR	Indonesian Rupiah
ITDP	Institute for Transportation and Development Policy
Jabotabek	Jakarta Bogor Tangerang Bekasi (Greater Jakarta, before 1995)
Jabodetabek	Jakarta Bogor Depok Tangerang Bekasi (Greater Jakarta)
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
JMATS	Jakarta Metropolitan Area Transportation Study
JTCA	Japan Technical Communicators Association
Kepmen	Keputusan Menteri (Ministerial Decree)
Kopaja	Koperasi Pengangkutan Jakarta (Jakarta Transport Cooperative)
Kopamilet	Koperasi Pengangkutan Mikrolet (Public Minivans Cooperative)
KWK	Koperasi Wahana Kalpika (Wahana Kalpika Cooperative)
LRT	Light Rail Transit
LTS	Large Technical System
Maglev	Magnetic Levitation
MoU	Memorandum of Understanding
MRT	Mass Rapid Transit
NMT	Non-Motorized Transport
Organda	Organisasi Gabungan Pengusaha Angkutan Darat (Association of Land Transport Companies)
PCI Almec	Pacific Consultants International Almec
PPD	Perusahaan Pengangkutan Djakarta (Jakarta Transportation Company)
PT ITC	Perusahaan Terbuka Indonesia Transit Central (Indonesia Transit Central Company)
PT JM	Perusahaan Terbuka Jakarta Monorail (Jakarta Monorail Company)
PT KA	Perusahaan Terbuka Kereta Api (State Railway Company)
PT LEN	Perusahaan Terbuka Lembaga Elektronika Negara (State Electronics Company)
PP	Peraturan Pemerintah (Governmental Regulation)
RPJM	Rencana Pembangunan Jangka Menengah (Mid term Development Plan)

SITRAMP	Study on Integrated Transportation Master Plan
STS	Science and Technology Studies
USAID	United States Agency for International Development
USD	United States Dollar
UTP	Urban Transport Planning

FOREWORD

Humans are dynamic beings, in the mental and physical sense. In population concentrations such as urban areas, this becomes all the more apparent and thus the question of how to provide access and mobility becomes a key issue for many cities as it concerns the livelihood and well-being of the inhabitants. This is the “reason for being” for the urban transportation sector, one that later on widened as it becomes an industry on which many depend. Technological innovation has been the key to this sector, allowing changes to be made: from feet to bicycles, from animal-drawn carriages to automobiles, from conventional trains to magnetically-levitated trains Maglev. This array of transportation modes still exists side by side, complementing each other, forming networks that shape cities. Some are following the path of automobiles, some shop for the best available technologies as they have the required resources, some opt for a mix of healthy doses of this and that, while many in developing countries are still struggling to find the most fitting solution to their needs.

Indonesia is among the latter, as its capital Jakarta, a city deemed to be the most modern in the country, still struggles to provide accessibility and mobility for its 9 million plus inhabitants. Optimists imagine that metropolis Jakarta will by 2014 be a more “modern” and “civilized” metropolis mirroring that of European and North American ones where yuppies in suits get on and off subways, monorails and rapid buses instead of honking their horns endlessly in congested roads. Fatalists, however, have a different take on the not-so-distant future. If there were no improvement in integrating more efficient means of transportation and the growth rate of private vehicles remains at the current annual average of 10 percent, there would be zero mobility in the city – except by foot (JICA, 2004).

As the country decided to industrialize through the development of automotive industry, Jakarta has grown to be a city of road culture which depends on automobile. When times are good, resources for transportation network development were spent on building highways and arteries, taking a *laissez-faire* approach, letting the market take care of public transport and marginalizing modes that are deemed to be against the image of modernity.

In Jakarta, like in so many other developing cities, the haves buy their private vehicles while many others are left with no choice than to take the decaying buses and minivans which provide mobility at a questionable service quality. As the city is increasingly sprawling and the number of commuters increases, streets become congested.

It is not by chance that the city inhabitants grew so dependent on automobile as grants, aids and loans from international and bilateral donor agencies are shaping Jakarta's urban infrastructure into that direction (except from some cases of railway development assistance. Not to mention the car manufacturers lobby for such an approach with the promise that the country would be the South East Asian car manufacturing base.

Buses are operated by private companies through "quantity licensing"[1] granted by the city administration without coordination of each routes (Fulton and Susantono, 2002). These licenses were then subcontracted to individual owners. A similar scheme also applies for smaller microbuses, public minivans and taxis. Furthermore, there are three-wheeled *Bajaj*s[2], a growing number of informal motorcycle taxis and a small remaining percentage of pedicabs serving everyday movement of Jakartans. Commuter trains are also available for certain limited routes, but service quality is also of question.

Recently, bus rapid transit (BRT) was introduced and plans for monorail and subway lines were laid out.

While financing schemes is already a challenge for the city administration, integrating the semi-formal (referring to the buses and minivans) and informal (referring to motorcycle taxi, *Bajaj*s and pedicabs) into Jakarta's macro transportation master plan is a more complicated task. The main bus companies are already financially incorporated in consortiums operating the BRT introduced to the city since 2004. Individual owners of buses and minivans, not to mention the drivers, however, have been overlooked. Before going further to seek rationalization strategies, there should be a thorough understanding

[1] Quantity licensing is a licensing scheme issued by transport authorities on the basis of proposed routes and the number of fleet, without coordination between routes or standards of service quality (Fulton and Susantono, 2002). In Jakarta, the authority grants the licenses to bus companies and/or public minivans cooperatives, both of which then subcontract the licenses to individuals.

[2] Bajaj is the local-term for three-wheeled door-to-door passenger transport service in Jakarta, Indonesia. Its name was derived from Bajaj Auto, an Indian company which have started producing the vehicle since 1971.

on whom and what shapes the current network. This research would like to pose the question of how the current urban transportation comes into being, how actors and technology are shaping its form, and how existing modes are structured in its operation and interaction with one another.

1. INTRODUCTION

1.1. Research Background

Indonesia has long seen a wide gap in development, prompting heavy population burden on its main island of Java. The island, which makes up less than 7 percent of Indonesia's area, is currently resided by some 60 percent of the country's 230 million populations (BPS, 2007). Although Indonesia entered industrialization at an earlier phase compared to other Southeast Asian countries, it still relies heavily on exports and exploitation of natural resources. While this commodity-based economy affected more of its natural landscape, the path that the country takes in industrializing affects more of its urban area.

Figure 1. Map of Indonesia
Source: Magellan Geographix

Indonesia's capital of Jakarta -- which has a population of some 9 million people, with an additional 2 million commuters from its suburbs (JICA, 2004) -- is not an exception. Despite the fact that the city contributes to around 16 percent of Indonesia’s gross domestic product (GDP), basic infrastructure provision -- including that for transportation --

remains a challenge for the city. The shape of its urban transport network could be attributed to the decision that the country made in accepting the role as one of the manufacturing base for Japanese automakers in the region.

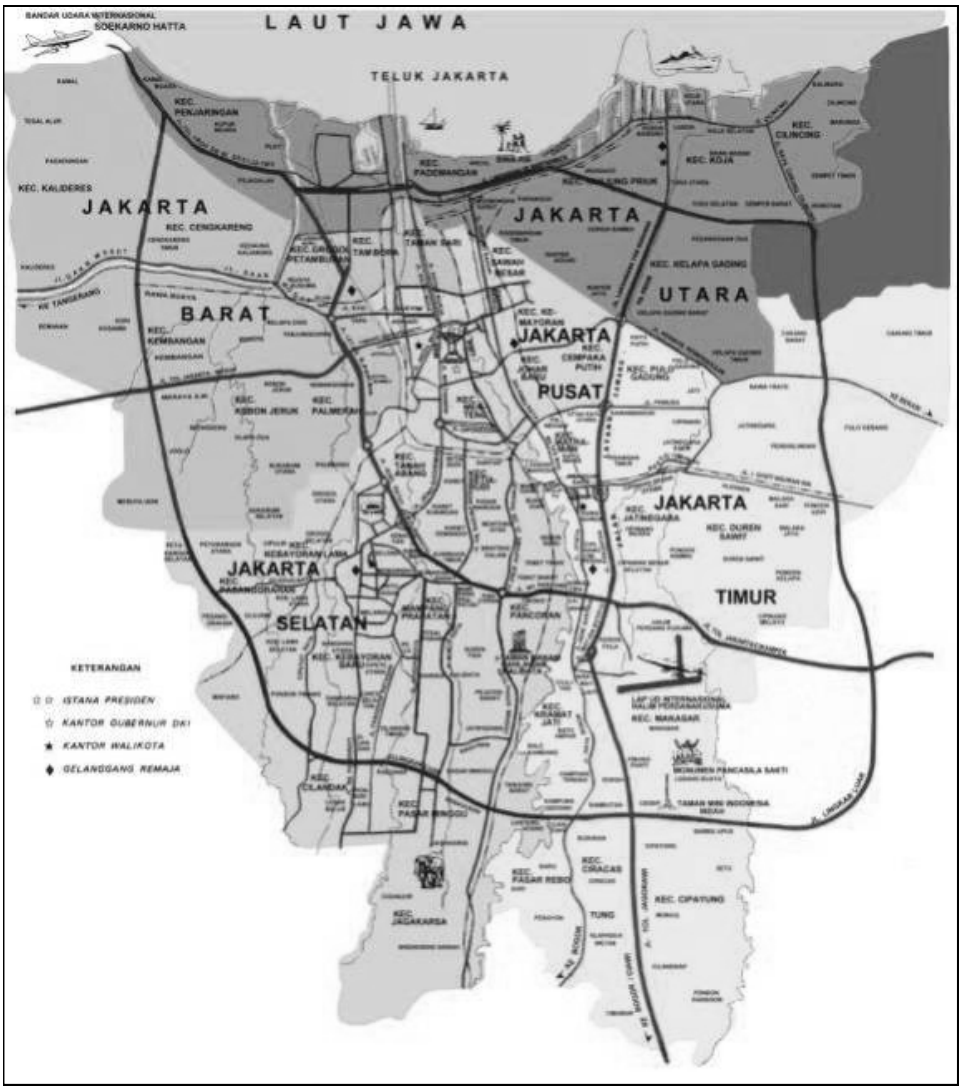


Figure 2. Map of Jakarta

Source: DKI

With a road-based transport network, decaying public transport, dependence on private vehicle and a continuously growing rate of motorized vehicle ownership, Jakartans are facing the threat of a gridlock on their streets by 2014 (JICA, 2004) if nothing continues to

be done. Despite the many studies on transportation issues that have already been conducted, it is not until recently that real changes are taking place in the city's urban transport network. One of the most prominent is the introduction of the BRT, a transportation system that proposed an exclusive right-of-way for city buses that was supposedly integrated with feeder services, non-motorized lanes and park-and-ride facilities. It was one adopted from Bogota's Trans Millenio, with unfortunately less success. The first corridor of BRT kicked off in 2004 and the service has since expanded to 10 corridors (3 of which are still in trial period). Meanwhile, plans for monorail and subway are on the way after a decade of delay.

With all the new modes gradually being introduced, Jakarta's existing public transport which currently operates in a semi-formal way resembling the characteristics of paratransit has remained untouched except for several rerouting and integration of large bus companies into the BRT consortia. Jakarta's streets are still shared by a rich array of transportation modes, including door-to-door paratransit service of three-wheeled *Bajaj*, bicycle and motorcycle taxis.

While securing funding sources for the future monorail and subway is already a challenge, a greater one awaits as to how the city will integrate the existing public transport network. So far, the administration seems to avoid dealing with individual public bus and minivan owners, drivers and others indirectly involved in the sector, it is here that the issue of conflicting interests lies, including that of corruption.

Learning from history, Jakarta municipality and the central government tend to sweep unwanted things under the rug by force. Its policy in the 1980s to ban human-pedaled passenger transport known locally as *becak*s has been criticized by many as inhumane. The policy was revoked in 1997 during the economic crisis and was then reenacted in limited areas after economic conditions improved, thus keeping this transportation mode in the margins of the city.

It becomes the purpose of this research get a better understanding on how the current network comes into being and who and what have shaped it. The research will take the city's urban transport network as a whole, including a brief look at Jakarta's urban

planning. And as what is going on locally has a lot to do with global phenomenon, it will also study the state of urban transport in similar developing cities.

As it seems that the introduction of new transport technologies triggers the problems this research is trying to address, it is considered worthwhile to look at how technology are affecting urban transport network and how it also shifts the interests of the human actors involved.

1.2. Research questions

The main question that this research is trying to answer is how actors, both human and non-human, are shaping Jakarta's urban transport network. This will hopefully answer at once how the current network came into being.

The following more specific research questions have been formulated for the purpose of obtaining a thorough understanding of the mentioned problems:

1. Who and what are the actors in the shaping the urban transport network in Jakarta?
2. To what extent has technology had a role in the shaping Jakarta's urban transport network and changing interests of the actors involved?
3. How do existing public transport modes and actors who are involved in them interact with each other?

1.3. Objectives

General objective

To analyze the role of actors and technology in shaping Jakarta's urban transport network.

Specific objectives

1. Analysis of the current state of urban transport network in developing cities to help identify general phenomenon of the issue
2. Analysis of the process that shapes Jakarta's urban transport network with focus on technological milestones, policy interventions and role of actors

3. Analysis of conflicting interests in urban transport, how negotiations are done and what mechanism is used in decision making
4. Analysis of how technology changes urban transport network and the interests that are involved
5. On the specific case of existing public transport:
    - Analysis of the informal nature and structure of how public transport in Jakarta operates
    - Identification of actors, their current role and their possible role during the introduction of new transportation technologies

1.4. Methodological overview

The first phase of the research involves an extensive literature study to understand the similarities and differences of the state of urban transport in developing cities. General problems are identified, possible causes are pointed out, and ideas are generated from this phase for possible adaptation into local context.

The Actor-Network Theory[3] has been chosen as the analytical framework for this research, due to its characteristic of avoiding a dichotomy between the technical and the social, and instead try to understand their interaction, of which is a phenomenon that occurs in the shaping of urban transport network.

The second phase is field study which involves the collection of data for the analysis, and interviews with stakeholders in the issue, which include government officials, local transportation experts, NGO activists in the sector, public transport company, association and cooperative representative, drivers and passengers. Additional interviews were later on conducted with people who are indirectly involved in the operation of existing transport system (driver's assistants, route timers, vehicle assembly and garage businesses). Aside from that, the author compiles secondary data related with the issue from documents of

[3] Actor-Network Theory is developed by French sociologist Bruno Latour (2005) partly as a critique to the approach of current critical sociology. Latour proposes to reassemble the 'society' by also taking into account non-human actors and meticulously retrace the forming and deforming of interests groups. The third chapter on this chosen theory will explain more about the methodology.

policies and regulations of the urban transport sector, including relevant newspaper articles.

The last phase is an analysis of the field study results, using the background knowledge from the literature study and the chosen framework.

1.5. Research limits

Due to time constraints, results from the field study are mostly personal interviews that would only be suitable for a qualitative analysis later on. A previously planned mini-survey to gather the perception of passengers of existing public transport could not be completed. Similar but older compiled data from previous studies has thus been used in place of this. Several issues had during the personal interviews also been requested to be made off-the-record due to their sensitivity. Such information can therefore serve only as background information for the analysis.

It was also realized after the field study that the methods in the analytical framework could not be fully employed, as retracing connections and associations of actors could only be done as far as related data, texts, artifacts and stakeholders are available. In this specific research, there are loop holes where actual documents related to old transportation policies could not be obtained, and stakeholders were no longer available or refused to be interviewed.

1.6. Thesis structure

This thesis consists of six chapters and an additional foreword aimed at explaining the background and issues that triggers the research. The first chapter is an introduction to the research geographical context, issue, questions, objectives, methods, limitations and structure of the research.

The second chapter provides a global overview of the state of urban transport in developing cities, pointing out similarities and differences, as well as already offered solutions to public transport reforms.

The third chapter explains the chosen framework for analysis, namely the Actor-Network Theory, which has helped structure the field study and later on the overall analysis.

The fourth chapter elaborates more on urban transport network in Jakarta, explaining historical and technological milestones, current condition and the process of how it comes into being.

The fifth chapter focuses more on analyzing the already described conditions and facts in the previous chapter utilizing the already chosen framework.

The sixth chapter concludes the overall study and points out further research possibilities.

2. URBAN TRANSPORT IN CITIES OF THE SOUTH

Observing how people and goods move about in cities of the South, one might be compelled to ask the philosophical question as to why these population concentrations are so different from the orderly fashion their counterparts do in developed countries. While the very root of it will require a long historical-political and global economic constellation discussion, for the purpose of this study it might be more worthwhile –and perhaps practical – to focus on the urban transport network, as a sector *per se*. Some might see the former as lagging way behind developed cities, some might argue that they are merely having different characteristics, but most would agree that urban transport networks in developing cities have yet been able to provide equal accessibility and mobility for their inhabitants.

Although one should try to avoid a generalization of the conditions of urban transportation in cities of the South, several characteristics are indeed shared by those urban areas. Does it have traffic congestions? Does it depend on private vehicles? Is there no integrated mass transit system? Does it have cut-throat competition of unregulated, privately owned minibuses? Do people, bicycles, pedicabs, sedans, minibuses, buses and even truck share the same lane, criss-crossing each other? Does it recently see rapid buses introduced?

Meakin (2004) pointed out three additional criteria to describe the public transport conditions in those cities, namely policy and regulatory framework, paratransit and formal subsidy. Under his definition, a 'developing' public transport system has yet addressed issues of explicit policies in the sector, the establishment of a hierarchy of different transport modes and for fare-setting, the existence of paratransit, the existence of a system of subsidies based on high administrative and analytical capability, and accurate ridership, cost and revenue data. The last point on subsidy should not be mistaken for the covering of deficits in a city's publicly owned bus company as the latter reflects not formal subsidy, but instead what Meakin described as 'the difficulty of resolving the policy dilemma between ensuring public service and earning a return on resources invested.' (GTZ , 2004, 3c: 4)

Developing cities in Africa, Asia or South America see an endemic of traffic congestion and a transportation network rich in modal split but disjointed between one sub-network and another. This chapter tries to elaborate the general problems in Cities of the South while highlighting the degree on intensity which they take place in different cities of different countries. It will also try to analyze the underlying interests that provoke such similar yet -- to a certain degree – different situations of urban transport development in those cities. From the analysis, comes the question whether transport issues could be solved only with technical solutions.

Studies in different cities of the South, from Sao Paolo to Dhaka, from Lagos to Jakarta, have all pointed out the problem of congestion as the main hindrance to better and more efficient urban mobility. Actually, congestion is not a problem; it is a mere indicator that these cities are facing a deeper and more structural problem in urban transport development.

In short, the state of urban transport in these cities can be portrayed as:

> *"…a growing urban population inadequately served by the transport system, declining standards of public transport, overlaps and conflicts among the agencies responsible…, massive growth in the use of minibus services, growing dependence on private transport, inadequate and deteriorating transport infrastructure, and poor facilities for non-motorized transport .."* (Kumar and Barret, 2008: 2)

2.1. General condition of urban transport in cities of the South

2.1.1. Lack of investment or mismanagement of resources?

In developing countries, infrastructure typically accounts for about 20 percent of total investment and 40 to 60 percent of public investment. The World Bank's "Cities on the Move" report reveals that cities in developing countries often devote 15 to 25 percent of their annual expenditures to their transport systems (The World Bank, 2002: 8). Looking at a list of GDPs of developing countries, one might directly point out the lack of available investment for transport infrastructure as the root of it all. While this might be true for cases

of cities with less than 5 percent urban land dedicated to roads, such explanation is not enough for a handful of other cities which has already built highways or inner-city toll roads. Transportation problems in the latter (case of cities) require a closer look at their urban structure and land use, as well as a historical analysis of transport infrastructure development and even the regional and global constellation of manufacturing system. An analytical approach of such will show us how cities of the South are very much alike in its dependency on cars and roads.

		Income/motorization rates		
		Low	High	
Population growth	High		Singapore	Formerly centrally planned
		Dhaka, Bangladesh	Bangkok; Manila; Hong Kong, China	Market
	Low	Samarkand, Uzbekistan; Almaty, Kazakhstan; Bishkek, Kyrgyz Republic	Moscow, Russian Federation; Warsaw, Poland; Budapest, Hungary	Formerly centrally planned
		Dakar, Senegal; Nairobi, Kenya	Prague, Czech Republic; Buenos Aires, Argentina	Market

Table 1. Relation between urbanization, motorization and market structure

Source: Cities on the Move, The World Bank, 2002

It might be useful to first point out several facts that takes place in the urban transportation scene of cities of the South. Physically, road network are either poor or inadequate, where in some cases in African cities can actually be attributed to low GDP and thus the lack of available investment. But, in most cities in Asia and Latin America, where road coverage has surpassed 5 percent of urban land, there is often a wide gap in road hierarchy as a result of treating the development of main thoroughfares and toll roads as projects symbolizing modernization, while forgetting that transportation infrastructure is more about building networks than merely building roads.

And all the while, along with roads comes rapid motorization as the rate of urbanization is increasing (except for Latin American cities already having a significant degree of urbanization) and a middle class that perceives private vehicle ownership as a status symbol is growing. While the insistence of building more and more roads has a lot to do

with a political approach based on economic reason of industrializing through the automotive sector, the latter – though it is still a subject of discussion – has to do with concentration of population as a market. Townsend (2003) points out that theories relating income growth and motor vehicle ownership implicitly stated that '*governments should create the conditions under which individual consumers could most efficiently fulfill their interest in owning and operating motor vehicles*.' (Townsend, 2003: 25) Some can still argue whether the story of 'the demise of streetcar' in United States' cities was mere conspiracy theory or more a result of consumer voting with their pockets as their income grew, but we definitely see the pattern of private vehicle dependence under the duet of road-minded transport development and industrialization through automotive industry reoccurring in developing cities.

Such an analysis leads to the question of whether it was the lack of investment or actually a mismanagement of available resources –which most likely are in the form of foreign loans. While this less technical discussion will be taken further later in this chapter, it is obvious that the cities we are discussing are in a vicious cycle unless a different path is taken in developing further their transportation network. There is much to be done in this regard concerning urban management problems and mainly, as Meakin (2004) highlights, 'the political will to deal with controversial transport issues where stakeholders are likely to strongly defend their interests.' (GTZ, 3c, 2004: 38)

2.1.2. Disjointed transport network and land use planning

In most cases, it is historically rare to find developing cities integrating their transport and land use planning. What then can best describe urban transport of the cities of the South in this regard?

In Jakarta, for example, low density suburbanization that could be categorized as sprawling has led to increasingly long commutes. Despite many transportation studies conducted since the 1970s, it was not until the last five years that the city decided to integrate the shaping of its transport network with land use planning. During the late 1970s and early 1980s oil boom and flow of foreign investment, road infrastructure grew at a significant rate of 6 percent per year and all the while the number of daily commuters from

the suburbs to Jakarta increased four-fold and vehicle growth rate stood at 9 percent annually. (Fulton and Susantono, 2002). A more recent figure shows that between 2002 and 2005, the number of motorized vehicle in Jakarta grew at 21 percent per year. (DKI, 2008). According to a study by the Japan International Cooperation Agency (JICA) on the Jabodetabek Integrated Transportation Masterplan (SITRAMP), commuting trips in the city increased 10 times between 1985 and 2002. By 2014, if this do-nothing scenario persists there will be a total congestion in the city streets and highways. (JICA, 2004) It seems that the more road it builds and expands, the more congested it becomes.

Like Bangkok and Kuala Lumpur, Jakarta is among cities whose urban fabric is shaped by road culture. During its 'golden era' of development, these cities opted for road infrastructure project and neglected other forms of transportation, especially mass transit. There are factors of interests playing in this, which would be explained more later on. In short, constructing roads and relying heavily on them further promote increasing urban sprawl and suburban residential areas which then resulted in the increasing number of daily commuters that surpasses the road capacity.

Cities in Latin America are also having more or less the same structure and facing the same phenomenon. Mexico City saw an increased in population by nearly 50 percent, of which all growth has been in the suburbs. In Sao Paulo, two-thirds of the population growth during the 1990s occurred in the suburbs. Nearly one-half of the urban area population is now outside the city of Sao Paulo, while Buenos Aires saw 80 percent of its population living in the suburbs. (Cox, 2007)

It is proposed that these type of cities, instead of trying to turn back time, look for ways to ease traveling burden by creating sub-centers, dispersing activities in several directions. Sub-centers do not have to be a built-from-scratch activity nodes, but they could also be existing ones that are strengthened and better connected to one another.

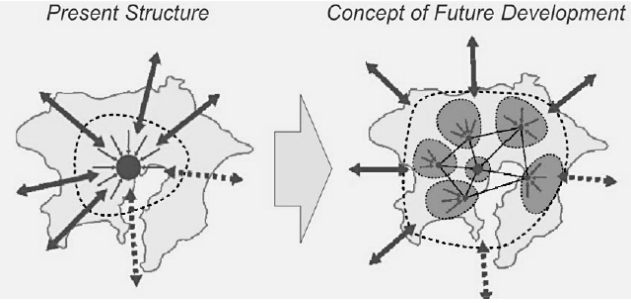


Figure 3. Urban decentralization into sub-centers

Source: Petersen, 2004

2.1.3. The state of public transport

Road congestion and problems of road maintenance is a shared situation in cities of the South. It is only a logical consequence of building roads without maintaining the availability and appeal of public transport to all its inhabitants. An already neglected public transport met with increasing congestion and dependence on private vehicle spells doom for these cities. It is another vicious cycle. The next graphic clearly shows the many vicious cycles faced by cities of the South.

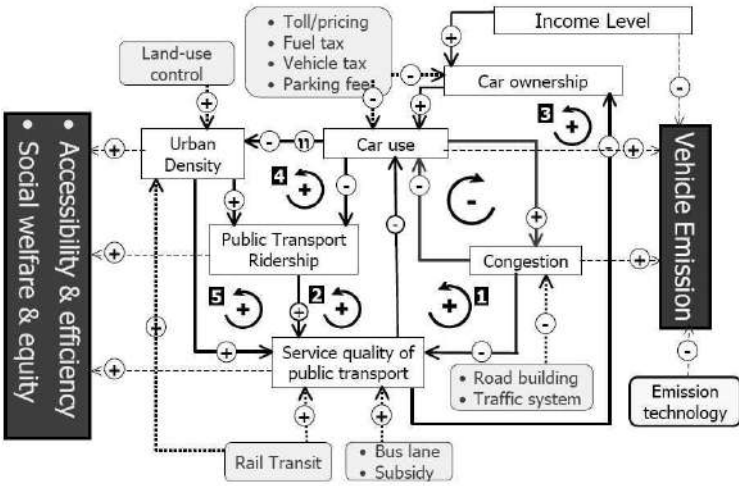


Figure 4. Understanding urban transport dynamics

Source: Acharya, 2007

These cities are mostly having a public transport company, plus a wide array of means of getting around provided by private companies, cooperatives, families, individuals or whomever interested in joining the band. The latter provides for the majority of city residents, affordable mobility, though also at a questionable service rate. This will be discussed further in this chapter as paratransit and informal urban public transport.

Kumar and Barret (2008), in a study of urban transport conditions in 14 African cities, highlight the fact that where road network is substandard, productivity of public transport is sapped, deteriorates and becomes unreliable, prompting people to opt for private vehicle with greater maneuverability whenever possible.

In most cities of the South, public transports are privatized, especially those serving as road-based services like buses and minibuses. Such was the case in Jakarta, Manila, Kuala Lumpur, Bogotá and several other Latin American cities.

2.1.4. Paratransit and informal public transport

Transport pattern	Asian cities	European cities	US cities
Car ownership (passenger cars per 1000 pop.)	109	392	608
Vehicle ownership (vehicles per 1000 pop.)	224	452	749
Specific road length (meters per capita)	1.1	2.4	6.7
Road density (meters road per urban ha)	122	115	89
Non-motorized Transport/ NMT (walk, cycle, pedicabs, % of work trips)	19	18	5
Role of public transport (% of all passenger km)	48	23	3
Car use per person (km per capita per year)	1,397	4,519	11,156
Energy use per person (private passenger transport/ capita (MJ))	6,969	17,218	56,807

Table 2. Comparison of Transport Pattern

Source: Petersen, 2004

In cities with deteriorating public transport, the haves opt for private cars, those who can afford to buy motorcycles do so through credit, and the poor remains a luring market for yet another actor in the industry: paratransit and the informal urban transport.

	Large-vehicle ''formal'' transit	Paratransit			
		Mini-bus	Shared taxi	Other	Total
Africa					
Abidjan (1998)	37	33	24	6	67
Alger (2004)	6	52	77	13	94
Cairo	48	52	0	0	52
Capetown	74	26	0	0	26
Dakar (2003)	5	74	17	4	95
Latin America					
Mexico City	27	48	25	0	73
Asia					
Delhi (2000)	92	0	0	8	8
Jakarta	66	34	0	0	34
Manila	24	73	3	0	76
Tehran	44	27	29	0	56

Table 3. Percentage of public transport trips

Source: Godard, 2002

The two terms often overlap each other. While paratransit can be both legal and illegal, informal transport best reflects '*the context in which this sector operates -- informally and illicitly, somewhat in the background, and outside of the officially sanctioned public transport sector*'. (Cervero, 2000: 3) According to Cervero (2000) what separates informal transport operators from others is that the lack of regulated environment. He further points out that:

"…in some instances, (informal public transport) operators lack the necessary permits or registration for market entry in what is a restricted, regulated marketplace, fail to meet certification requirements for commercial, common-carrier vehicles -- such as minimum vehicle size, maximum age, or fitness standards. Other violations include lack of liability insurance, absence of a commercial driving permit, and operation of an unclassified or substandard vehicle." (Cervero, 2000: 4)

Tuk-tuk, jitneys, mikrolets, bajajs, collectivos, cars rapides, molue, dala-dala. Whatever their names, they all serve one purpose in each of the cities that they belong to~~,~~ : a complimentary means of moving around, on the background of the formal setting or disguised under one that lacks supervision.

This type of public transport are mostly owned by individuals owning a fleet of less than a dozen vehicles at the most, which are subcontracted to drivers for a fixed sum (of money), be it daily, weekly or monthly. Vehicles are often locally assembled or bought second-hand. In their operation, despite the fact whether they have legal credentials, there are rent-seekers in the form of traffic officers, policemen and local thugs who sap their already thin profit. Cervero (2000) coined the term '*laissez-faire* transportation'[4] to shortly define paratransit and informal public transport..

In Accra, Dakar, Bamako, Kampala, Dar-es-Salaam and Nairobi, the government makes no attempt to control the supply of minibuses—that function has been left to route associations or syndicates. Such was also the case in developing cities in Asia and Latin America. Despite its notoriety, this sub-sector is for many developing cities a source of job provision, as pointed out below:

> *"In many poor cities, informal transport comprises as much as 15 percent of total employment. In Dhaka, Bangladesh, the figure is closer to 30 percent, with a good 100,000-plus men and back-hauling patrons and goods aboard pedicabs for living. Adding in intermediate goods and services like vehicle maintenance and local vehicle production, assemblage, and parts retailing increases the percentage even more. "* (Cervero, 2000: 7)

Ownership of informal urban transport is very fragmented, making it difficult for any city government to re-regulate them. Some critics applaud the micro-entrepreneurism of informal urban transport and its role for the urban poor and working class, however in circumstances where the number of vehicles exceeds road capacity, varying modes moving at varying speed contest for road space and a reckless mentality prevails, traffic jams are inevitable. In such casees, informal carriers must be regulated.

[4] Laissez-faire here refers to the approach taken by authorities of the city with regard to policy, regulations and supervision of the urban public transport sector. As a sub-sector, despite being highly fragmented, paratransit and informal transport actually have a very structured way of operating.

2.1.5. Lack of institutional capacity and weak regulatory role of governments

The existing paradox of informal urban transport itself leads to another core problem that cities of the South are facing. Kumar and Barret (2008) pointed out that effective urban public transportation requires coordinated attention to urban planning, to the construction and maintenance of infrastructure, and to the organization of transport services.

In their study in 14 African cities, these functions are seldom combined as explained:

> *"Even where all three functions remain at the central government level, several different ministries are usually involved. In most of the cities studied, many institutions at all levels of government—federal, state, and local—are involved in planning, regulating, licensing, and monitoring urban transport. The net effect of the widespread role confusion in regulation and planning is poor accountability, lack of coordination, and diffusion of commitment at all levels toward the implementation of transport strategies that serve people's needs. In short—ineffective regulation and an almost universal absence of integrated planning."* (Kumar and Barret, 2008: 6)

Clearly, part of the problem is the lack of institutional capacity and regulatory role of the government as provider of basic services in a city, varying in degrees from poor integrated planning to a laissez-faire approach to the provision of quality public transport.

2.1.6. Non-motorized transport as 'second-class' option

Despite the fact that in the very beginning, way back before motorization, transportation comprises mainly of walking, for so long – even until today – developing cities tend to label non-motorized transportation as 'backward' and not being in line with the image of modernization that they would like to achieve, disregarding the fact that between 20-47 percent of trips (Tiwari, 1999; Vasconcellos, 2001) there are either by foot or using non-motorized vehicles. This is actually mirroring the type of development taking place in US cities, where motorized vehicles are treated as first class citizens in the street, forcing people to take their cars even for short trips.

Walking, as a mode of transportation in itself and also a complementary form to other modes like public transport, has been made difficult and even dangerous by neglecting the rights of pedestrians. Where it is available, sidewalks are poorly paved with physical obstacles, be it in the form of inappropriate placement of street artifacts or the domination of street vendors. It was not until recently, in cities developing BRTs, that more attention is given to developing proper sidewalks.

Cycling, however, is accommodated in some countries like China, whose capital city of Beijing saw cycling accounting for some 50 percent of daily trips (Vasconcellos, 2001) -- although the number has likely fallen due to the rate at which these cities are developing roads. While Chinese cyclists are lucky to have separate–lanes, those in most other developing cities have to bear the danger of getting hit by motorized vehicles, not to mention that from inhaling polluted air. In African cities, people avoid cycling as it is associated with poverty, while in most Latin American and Asian cities, cycling is either for children or mere recreational sport.

Another form of NMT that has been neglected and even banned in several developing cities comes in the form of human-pedaled passenger transport like *rickshaws* in Indian cities or *becaks* in Indonesian ones. According to Hook (2000), the livelihood of some 25 million poor families in Asia is dependent on this means of subsistence, although others like Cervero (2000) would argue that it is a bit 'inhumane' to keep this kind of transportation as drivers are directly posed to health and safety risks.

2.2. Urban transport infrastructure, for whom?

So far, the above mentioned points are the apparent problems that one can identify as the fundamental cause of urban transport problems in cities of the South. However, taking the hypothesis that urban transport is not merely technical problems but more of political one, there could be a bigger challenge ahead.

National political set up and international aid and technical assistance institutions

Cities in Southeast Asia, for example, underwent a different process of change than that experienced by the more automobile oriented cities of the industrialized nations. Townsend pointed out in his study of Bangkok, Kuala Lumpur and Singapore, that '*while all cities had coalitions of interests, it was the complexion or make-up of the coalitions that have influenced transport changes and determined the overall outcomes.*' (Townsend, 2003: 315)

In the case of comparison that Townsend (2003) did in Southeast Asian cities, he found that unlike Malaysia and Thailand, Singapore which was deemed more advanced in developing its urban transport network, has a single ruling party which has its claws deep into the private sector including transportation. This relatively paved the way of determining what is best for it and minimizing conflict of interests:

"Much of the finance for building rail infrastructure in Singapore comes from the highest charges in the world on the ownership and use of privately-owned motor vehicles. Effectively, these collective actions under the direction of paternalistic leaders have constrained people's urban transport choices in ways that have not emerged under democratic regimes…Singapore's successes was linked to actions taken to slow growth in motor vehicle ownership and use and promote high quality public transport, while incomes and GDP rose " (Townsend, 2003:13 and 231).

Unlike Singapore, under a different set up of political situation, Bangkok grew into a city of short-term interests when it comes to urban transport infrastructure, at least until after the 1997 economic crisis. In 1970s, for example, while public road-building, mass transit and road-pricing programs were proposed, the projects done were those that served the economic interests of private companies and government ministers.

"Rather than publicly funded programs that could have served the interests of average people, the government pursued ad-hoc road-building projects that provided short term material benefits to contractors who were either government ministers or the relatives of government ministers." (Townsend, 2003: 282)

In contrast, railway development was challenged by more difficulties because of the required large investment and stronger commitment, both of which were not in line with the interests of the countries main focal actors. Bangkok's first operational rail mass transit system was made possible by a coalition of interests which included the World Bank's interest in private provision of infrastructure, and the German government's interest in lending money for projects which provided opportunities for German companies. (Townsend, 2003: 284)

Meanwhile, in 1970s in Kuala Lumpur, the interests of the World Bank in encouraging low-cost operation and competitive bus-based public transport were in line with the interest of the UMNO-led government in increasing participation of native Malays in urban private enterprise. However, some plans were not executed because decision-making powers were not shared equally.

"One proposed action which was supported by the Prime Minister as part of an election commitment was to establish a rail mass transit system in Kuala Lumpur. However, beyond the level of study and planning, this action was not undertaken because the World Bank, one of the only sources of large investment at that point in Malaysia's development, was not interested in financing rail mass transit which was viewed by free market economists as too expensive to build and operate." (Townsend, 2003: 287)

Later on, during the reign of Mahathir Mohammed, private investment was more interested in profit-making activities through the expressway construction and operation. Townsend points out that this benefits 'well-connected companies' and attracts interests in housing development projects offered in one package with the development of toll roads. One of the companies receiving the concessions was the daughter of then President Soeharto of neighboring Indonesia. This takes the network of interests to the regional level.

In terms of serving certain interests in urban transport infrastructure projects, Indonesia, Malaysia and Thailand shared a common history. During the 1980s and 1990s, all three governments were relying on foreign direct investment from Japanese car manufacturers as part of the countries' main basis for industrialization. Nurturing the growth of the car industry through the growth of domestic market must go hand-in-hand with the

construction of roads partly funded by the World Bank. This lobby pressure, absent in the Singapore case, explains the reason why it took a different path from other Southeast Asian cities as described:

"While Singapore's success in implementing plans and strategies in restraining motorization is often portrayed as the result of "political will" or as a technical feat, it is actually the relative weakness or absence of actors articulating interests which would conflict with these measures (e.g. interests of middle class people in owning and using cars, interests of automobile manufacturers and retailers) which explains their successful implementation in Singapore." (Townsend, 2003: 304-305)

The question of opting for road-based urban transportation projects is not only based on the lobby of car manufacturers or oil industry. It also has to do with the changing manufacturing process which then leads to the changes in delivery of goods and just-in-time approach. Highway and toll roads in cities of the South are built not only for private car owners, but also as a means for goods distribution.

Townsend concluded that the change technology of the urban transport sector had led to a change in ideas and theories. As studies on transportation rely on expert opinion, their results will also vary as the related opinions are affected by certain values of motorization and what kind of motorization should cities accommodate. Such divided opinion mixed with local, regional and global political interests will lead one to believe that urban transport infrastructure is the result of more politics than technical issues.

Such underlying interests could also be seen during the implementation of even the praised case of BRT development in Bogotá. Separate studies (Perez-Castro, 2008 and Pulido-Martinez, 2008) pointed out that the introduction of the new system changes the social construct of workers in the urban transportation sector and benefits more the big companies involved in the process of construction and operation.

Cases of underlying interests as the backdrop of several BRT implementation failures can also be observed in Jakarta, where delays in procurement due to non-transparent tender process has both worsened traffic congestion and lowered passengers' positive perception

of BRT service. The ones who benefit from that are only the companies involved in the BRT consortium.

Although so far dubbed as the most rational and financially feasible approach to solving traffic woes in the cities of the South, the implementation of a BRT system is not free from underlying interests.

The next chapter will provide a clearer framework to follow how actors, offers of available technology and interests are shaping of urban transport network by observing the role of actors and interests

2.3. Resolving conflicting interests

Putting most feasible technical solution into context

Category			Transport mode
Infra-structure	Public/ Private	Transport Volume	Asian Cities
Rail	Public	Mass Transit	Subway, Light Rail Transit
			Airconditioned Bus Non-airconditioned Bus
Road		Middle-size Transit	Mini bus Jeepney, Remodeled Bus
		Individual Transport	Taxi Tuktuk, Trycicle, Songtaew Bike Taxi
			Non-motorized mode (rickshaw, carriage)
	Private		Passenger Car
			Motorcycle Bicycle

Table 4. Available choice of urban transport mode

Source: IATSS, 2004

Technically speaking, the options are already there: BRT, light rapid transit (LRT), mass rapid transit (MRT), NMT or a proportional mix of all of them. But, then again, as Bogota former mayor Penalosa said in his speech: urban transport is a political rather than a

technical issue. The technical aspects are relatively simple. The difficult decisions relate to who is going to benefit from the models adopted. From the previous discussions, it is obvious that the shaping of urban transport network involves more economic and political aspects playing with technical ones. Penalosa, who was praised for making changes in Bogota's urban transport network for the better explains from experience that:

"Transport differs from other problems developing societies face, because it gets worse rather than better with economic development. Transport is also at the core of a different, more appropriate model that could and should be implemented by Third World, developing cities." (GTZ,1a, 2005: 1)

Currently, in most cities of the South, payments to police officials, and sometimes military officers, are effectively a form of site rent – protection payment for the right to congregate and occupy crowded critical intersections (Cervero, 2000) is actually the cause of ever striving semi formal or informal urban transport despite the introduction of more effective system like BRT. In Bangkok, as explained by Townsend, 'greed and graft fuel the system of informal transport sector that has been organized around a hierarchy based on power and influence.'

The questions of solving conflicting interest lies not only between the formal and informal, legal and illegal. It is also about institutional coordination. In Buenos Aires, for example, there is an overlapping authority between national, provincial and municipal governments (GTZ, 2004, 3c). As in Bangkok, urban transport policy initiatives developed by one level of government or agency are frequently blocked by another level of government or agency with overlapping or related authority. (GTZ, 2004, 3c: 3)

Meakin (2004) pointed out that effective public transport management should be built on four foundations, of which ultimate responsibility for creating and maintaining them rests with central government. The four foundations are:

1. A coherent policy and implementation strategies
2. A structure of the public transport industry that is amenable to competition or regulatory control
3. A regulatory framework that provides a legal basis to impose the right mix of obligations and incentives

4. Effective supervisory institutions that have sufficient capability and independence to undertake basic network planning, administer regulation and guide the development of the industry

As a way to better coordinate conflicting interests, most cities of the South have progressed by setting up a transportation authority. The rationale for establishing dedicated public transport authorities in developed cities is based on two main factors:

1. The management of public funds to procure transport services, distribute subsidy and to secure the best value for money
2. To plan and manage bus and rail networks on a conurbation basis, with full service and fare integration between modes.

(GTZ, 2004, 3c: 19-20)

As it has been observed how varied and different interests concerning urban transport in a city can be, there is no single recipe or a one-size-fits-all system. Meakin highlighted that no structure of coordination is more superior than the other. It could be something like Bangkok's Mass Transit Authority, or it could be like Hong Kong's central level authority. Both could work as long as it serves the role of accommodating the best interest of the public. These transport authorities are the ones who usually study the most feasible urban transport infrastructure concessions in cases where public-private partnership is required. Zegras (2006) reminded that:

"Concessions must only be a tool for delivering infrastructure that has been proven to be in the "public interest" through a thorough strategic analysis and project evaluation. If investment decisions are devolved to market forces, then we might get the delivery of some major infrastructure (particularly motorways), but not a coherent urban transport program." (Zegras, 2006: 24)

All the similarities in problems have been more or less laid out and frequently discussed for cities of the South. Many have agreed that the solutions are on the table, but direct transfer of technology and system should be avoided despite their similar urban transport network characteristics. BRT might work for Bogotá, but unless improved and implemented carefully, it will not work in Jakarta. Singapore might be successful with its Land Transport Authority (LTA), but unless such institution is established carefully

recognizing conflicting interests, it will not work in Mumbai. This recurring phrase of ‘conflicting interest’ will serve as the rationale for us to study further who are shaping the urban transport network and how.

3. ACTOR-NETWORK-THEORY: FRAMEWORK ANALYSIS FOR THE SHAPING OF URBAN TRANSPORT NETWORK

In a bid to clearly point out the root of the problems that developing cities are facing with regard to their urban transport network, one could not simply put to use computer modeling techniques to come up with the best system or conjure notions of conspiracy theories in mind to study underlying interests. The basic 5W (who, what, when, where, why) and H (how) adopted from basic journalistic might come in handy, but due to the complexity of the issue, a more scientific approach is required.

While basic stakeholder analysis can help explain underlying interests in the shaping of urban transport network, one basic trait of the issue: technology and how it is accepted or rejected in the development of transportation remains unexplained. As transportation issue -- the way people and goods move about -- has predominantly been altered by technological innovations, taking the framework from the discipline of science and technology studies[5] (STS) could provide a better framework. STS researchers have largely dwell in the issue of understanding how science and technology shape and are being shaped by the social factor.

Among the works of STS researchers is that from Bruno Latour (1987, 1991, 1992, 2005). For the purpose of the research, the framework proposed by Latour is chosen due to its avoidance in separating the technical and the social, but instead trying to see how both interact with each other, a phenomenon that occurs in the shaping of urban transport network. Latour's way of following scientist engineers, innovations and technology in the making, and how non-human artifacts are also regarded as actors – as opposed to stakeholder analysis which limits the definition of actors as human being – comes in handy when understanding the issue of transportation.

[5] STS is the study of how scientific and technological innovation affects the socio-political and cultural set up and vice versa. It includes the study of sociology of science, history and philosophy of science and technology, and has recently embraced the field of public policy with regard to technology.

Take the case of the fixation on private cars. While it is true that the interests of the automotive and oil industry, the forming of consumer society and accommodative government policies play a great role, the fact how an artifact like private car rolls into a technology that represents freedom and status is rarely put under scrutiny. What does a car really do? What are its characteristics and how does it work that makes it so appealing and accepted by the many? What other factors aside from human actors play in the role of making it an inseparable machine in human life? Or in a different case, why environmentally friendly modes like NMT is regarded as 'backward' by governments in developing cities. What does it physically, visually and socially lack as compared to motorized vehicle? Furthermore, in success cases of the spread of certain modes of transportation, is it only human actors that play a role? What are the role of laboratories, regulations, statistics and data?

The perspective of taking into account how technology itself is an actor is also useful in understanding choices made by human actors that seem irrational. However, technology and artifacts are still only a part of the network of connections in the shaping of urban transport network. It is no less important to keep track on how human actors – as individuals, institutions, or groups – use the available technology and interact with it and with each other. Another important concept offered by this theory is its position in placing nature and society as consequences instead of causes of human actors' work in science and technology.

The next sub-chapters will try to elaborate on understanding the Actor-Network Theory, technology in the making and its implementation in analysis already done in the field of transportation.

3.1. Actor-Network Theory and Science in Action

The Actor-Network Theory, having its roots in the works of STS researchers in Ecole des Mines in Paris, France, evolves from a semiotic approach to understand the 'social' in its relation to science and technology by retracing interactions, connections and associations between all aspects. Prior to coining the term Actor-Network Theory, Latour started the

shaping of this framework by trying to follow science and technology in the making (Latour, 1987).

The methods of this framework are (Latour, 1987: 258):

1. It observes science and technology in the making, and thus requires observer and analysts to either scrutinize the process from the beginning or whenever questions and controversies arise, reopening the already black-boxed artifacts.
2. Instead of observing intrinsic qualities of a claim, it focuses on the transformations occurring in later users' hands.
3. It considers symmetrically all efforts to enroll human and non-human factors, and refuses to take nature and society as the source of settlement of controversies. Nature and society are consequences.
4. It avoids dichotomy and division of things, in short, it keeps itself open and undecided as to follow and trace connections and associations.
5. It observes how inscriptions are gathered, combined and tied together.

Some key principles of the framework are the argument that facts and machines are the result of the tying together of interests and, later in users' hands, interests will change and evolve. At first:

"Scientists and engineers speak in the name of new allies that they have shaped and enrolled; representatives among other representatives, they add these unexpected resources to tip the balance of force in their favor." (Latour, 1987: 259)

As fact-building takes place and machines are built, it becomes important to understand them as it is to understand who the human actors are.

In short, Latour proposes a way to analyze how technological innovations are questioned, accepted or rejected by following scientists and engineers in how they build their arguments, seek allies, observing those allies in how they respond to the proposed ideas and later on how the ideas roll into and are utilized by the many. While most social sciences are limiting themselves in defining 'what is social' and focusing merely on interests, Latour argues that "*..the more.. the controversies (of ideas and innovations) go on, the more we were led into what are called technicalities..*" (Latour, 1987: 30) and that

the initial interests are not more superior than the ones evolving later on as the fate of whatever that rolls out from the process is in “later users’ hands. (Latour, 1987: 29)

Latour coined the term ‘black box’ to refer to an already stable environment of technological innovations. In order to close the black box, one has to find enough supporting interests, broken counter-arguments of opposing ones and build a ‘machine’ that is accepted. When the black box reopens, the process begins again until it reaches another stability.

Among the important points of this framework is to understand the discipline of rhetoric as the study of how people are made to believe and behave and taught on how to persuade others. (Latour, 1987: 30)

Latour (1987) shows how academic and scientific papers employ this method by bringing argument from authority (e.g. citing well-accepted theories), and referring to former texts (where citations of scientific papers acts on others to make them more in keeping with proposed claims). It is then strengthened by being referred by later texts.

In the context of transforming text into artifacts, more phases are involved, those that require one to delve more into technicalities as have previously been mentioned.

The first phase of asserting one’s idea is about translating interests, how to get others – be it fellow scientists, engineers, data or artifacts – to back one’s proposal. It at once means ‘offering new interpretations of these interests and channeling people into different directions.’ (Latour, 1987: 117) Human actors can either enroll others so that they participate in the construction of the fact or control their behaviour in order to make their actions predictable. (Latour, 1987: 108)

On the process of doing so, one could adopt one or more of these strategies:

1. ‘I want what you want’

   This piggy-backing strategy works by tailoring the object in such a way that it caters to people’s explicit interests. As Latour points out ‘the easiest means to enroll people in the construction of facts is to let oneself be enrolled by them’ (Latour,

1987: 108). By applying this strategy, one would use less controvertible arguments, simpler black boxes and less disputable fields.

2. ‘I want it, why don’t you’

   This straight-forward strategy is only possible in situations where the focal actor proposing the idea is on a stronger position to those whom one would like to interest or, as it rarely happens, two different interests find a way of utilizing each other.

3. ‘If you just make a short detour’

   In this more realistic and more probable case, one actor tries to convince others not to change their goals, but simply taking a detour – which means accepting to be enrolled in as the former’s ally.

4. Reshuffling goals and interests by displacing goals, inventing new goals or inventing new groups

5. Becoming indispensable

   This last state of translation is where all the four translation strategies would sum up to. In this condition:

“*The contenders would simply sit at a particular place and the others would flow effortlessly through them, borrowing their claims, buying their products, willingly participating in the constriction and spread of black boxes.”* (Latour, 1987: 120)

From this last point, ‘the black box moves in space and becomes durable in time through the actions of many people’ (Latour, 1987: 137). However, in the course of time, even black boxes that have become indispensable are prone to questions and counter-arguments. Thus, it is important to continuously seek new allies, opening up to unexpected allies and build a ‘machination’ where ‘borrowed forces keep one another in check’ to build a stronger association. (Latour, 1987: 129)

As highlighted before about this particular framework, it is important to remember during its application not to limit one’s observation to human actors, but also non-human ones like inscriptions, texts, artifacts and the closed black box itself.

As it is impossible to really follow scientists and engineers during science and technology in the making, in the later development of this framework, Latour made clear as for the

method to be employed: tracing the forming and dismantling of groups of actors. (Latour, 2005: 29) One thing highlighted in this later work is that it is important not to prejudge the social world in place of the actors, that:

*"Every single interview, narrative, and commentary, no matter how trivial it may appear, will provide the analyst with a bewildering array of entities to account for the hows and whys of any course of action." (*Latour, 2005: 47*)*

In this later development of the framework, Latour makes it clearer as how non-humans can be accounted for as an actor. It can be both intermediary and mediator in the forming and dismantling of groups. How then can one trace its action? The first proposal would be studying it in the context where it is being made and use.

"In these sites, objects live a clearly multiple and complex life through meetings, plans, sketches, regulations and trials." (Latour, 2005: 80)

This proposal makes it important to study science and technology in the making, a time when an object has yet become closed black boxes and recede to the background. The second approach is to observe an object – even as a closed black box -- in situations where it is no longer taken for granted, such as when it is introduced to users who are previously distanced from it, those who are unfamiliar with it.

Another important point in this framework is to avoid being deterministic in analyzing the social:

"For the social sciences to regain their initial energy, it is crucial not to conflate all the agencies overtaking the action into some kind of agency – 'society', 'culture', 'structure', 'fields', 'individuals', or the 'power of the unconscious' as we would ordinarily do, but rather from the under-determination of action, from the uncertainties and controversies about who and what is acting when we act – and there is of course no way to decide whether this source of uncertainty resides in the analyst or in the actor." (Latour, 2005: 45)

3.2. Previous application of framework in the issue of urban transport network

Since its introduction in the early 1990s, the Actor-Network Theory has been picked up as a framework for analysis in many other disciplines, such as that of geography and urbanism, urban management, including urban transport.

Among the most recent is the work of Roel Nahuis (2007) in analyzing the politics of innovation in public transport development in the Netherlands. In this work, Nahuis focuses on democracy and displacements of interests in the introduction of new technologies and choices made for public transport. In his view, 'innovation is characterized by novelty and fluid actor constellations; that actors have to find their stakes before they can become stakeholders; and thus the politics of innovation is dealing with the inequalities, tensions and conflicts in practices at co-construction of technology and actors.' (Nahuis, 2007: 21) His main questions are how to conceptualize the politics of innovation in terms of displacements, how do displacements affect democratic quality and what are the underlying dynamics of displacements?

The Actor-Network Theory is applied as a perspective that offers understanding of innovation and democracy as constructions.

"This idea of action programs and antiprograms offers a rich and dynamic view on what is at stake in the politics of innovation." (Nahuis, 2007: 40)

In his case studies, Nahuis utilizes any available inscriptions found on the issue and observe how the newly introduced technologies in public transport succeeds and fails as they were being faced with counter-arguments and antiprograms. Among the conclusions, Nahuis found that:

"…technological innovations are not innocent or neutral in their social consequences on the agenda." (Nahuis, 2007: 28)

An earlier work by Graham and Marvin (2001) on analyzing the geopolitics of urban infrastructure network has also partly utilized the characteristics of the Actor-Network Theory in taking large technical systems of infrastructure network as part of the actors that at first act as mediators and later become intermediaries:

"*Large technical systems tend to be characterized by an initial growth phase, an accelerated growth phase, a stabilization phase where the system became black-boxed and taken for granted, and sometimes a decline phase where newer infrastructure systems came in to substitute for it."* (Graham and Marvin, 2001: 180)

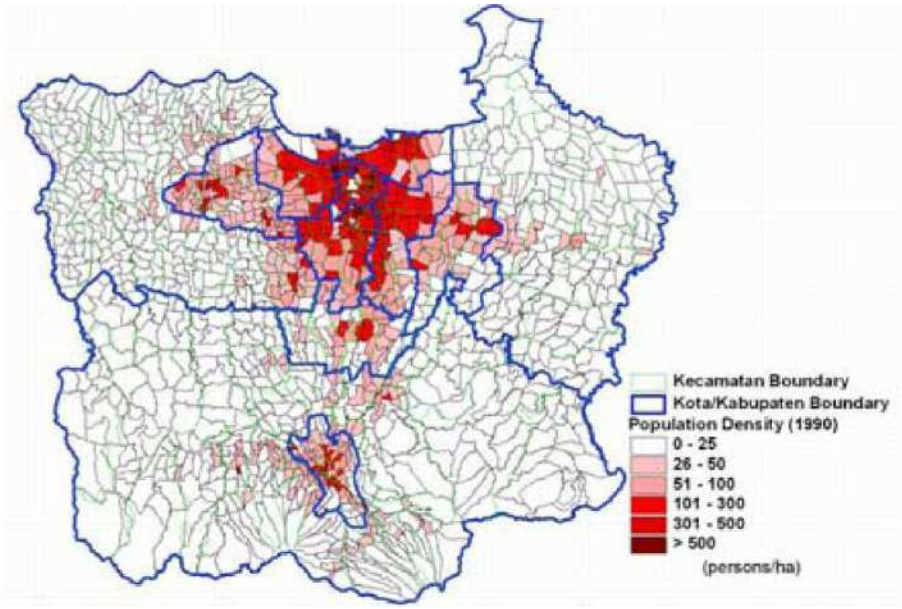
Part of this work concluded that such perspective 'helps demonstrate how systemic changes appear in the whole technological fabric of society, as interrelated clusters of innovations sometimes cohere into large technical systems through processes of social, political and institutional agency and entrepreneurship.' (Graham and Marvin, 2001: 400)

4. URBAN TRANSPORT NETWORK: JAKARTA, INDONESIA

In order to be able to apply the previously chosen theory in trying to understand how urban transport network in Jakarta comes into being, one would first need to examine available facts and data concerning the development of the sector in the city. This includes following all the changes that take place or will take place in Jakarta, as well as trying to have a closer look at how the current network is operating. And as urban transport development is inseparable from urban planning, it will also be worthwhile to take a look at how both are connected or in reality, disconnected.

4.1. Historical overview

Metropolitan Jakarta is currently among the world's top ten largest urban agglomerations with a combined population of 21 million, including that in the neighboring 7 local governments of Bogor Municipality and Regency, Depok Municipality, Tangerang Municipality and Regency, as well as Bekasi Municipality and Regency. Its core area, DKI Jakarta spans over an area of more than 600 square kilometers with a population that differs by day (12 million, (JICA, 2004)) and by night (9 million (BPS, 2007)) as commuters flow in (and out).



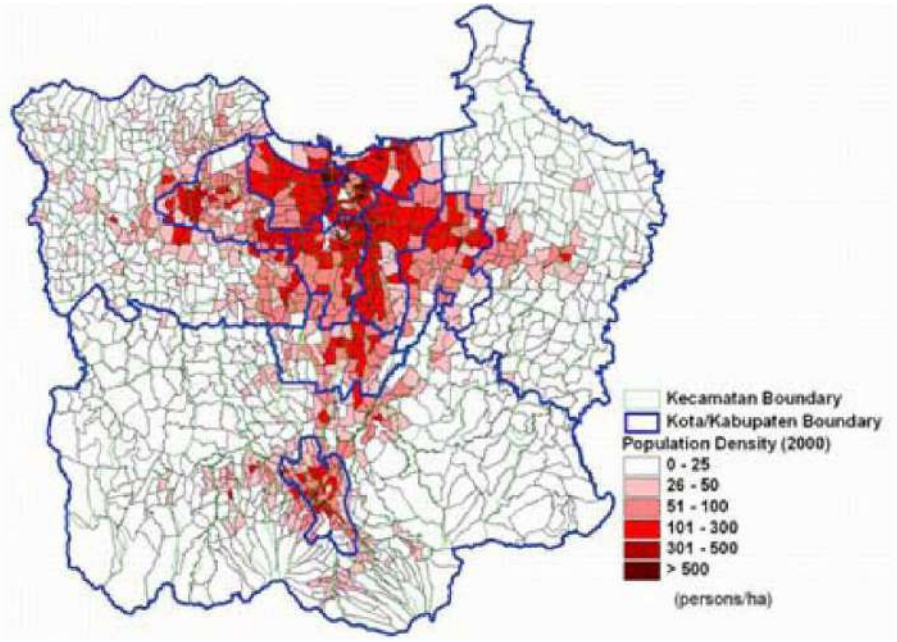


Figure 5. Jakarta population density 1990 and 2000

Source: JICA, 2004

Being the country's capital, Jakarta is not only the seat of government, but for more than three decades has also been a dominant investment destination, thus making it an economic magnet for Indonesians. During the 1970s to 1980s, as Indonesia was industrializing, Jakarta became one of the centers for manufacturing, especially electronics, automotive and consumer goods. Later on, it established itself more as a city of service (RPJM 2007-2012, DKI, 2008), catering to domestic and foreign financial institutions, multinational company headquarters and other service businesses. It currently shares 16 percent of national GDP and in the last two decade has received some 66 percent of Indonesia's total foreign investment and 45 percent of domestic investment. (Spreitzhofer, 2003).

Being a strategic place as both the country's administrative and economic center, development in Jakarta has always been a politicized issue. Even after Indonesia's decentralization process in 1999, much of what is happening in Jakarta caters not only to local city interests, but also those of national ones. Despite being envisioned as the most modern city that Indonesia can showcase to the world, the process of its development has

not been so. There is often a wide gap between plans and reality. This is very much true of both Jakarta's urban planning and transport network planning.

4.1.1. Urban planning development in Jakarta

The most crucial problem with Jakarta's urban planning is perhaps the fact that plans are not enforced on the ground and later on revised to suit the reality. This changes the whole meaning of planning for Jakarta authority. It becomes all the more a response and a reactive set of policies instead of the proactive nature it should have been.

Jakarta's first development plan after the country's independence was drafted in 1953 under the technical assistance of the United Nations (Franklin, 1964 in Arif, 2002), by then its boundary was its current inner ring road connecting Grogol (center of commerce) in West Jakarta, Cawang (center of industry) in East Jakarta and Priok (port and center of logistics) in North Jakarta. This became the initial draft of the city's first ratified master plan *Rencana Induk Kota*. In 1973, the acronym Jabotabek (Jakarta, Bogor, Tangerang, Bekasi) was first coined in a new master plan drafted by the Ministry of Public Works with the assistance of the Dutch Directorate for International Technical Assistance (Arif, 2002). This master plan tried to accommodate the fact that Jakarta has sprawled beyond the boundaries of the 1953 plan.

This was again revised and ratified in 1985 into a long-term Jakarta Spatial Structure Plan 1985-2005 as a lot of practice on the ground violated designated zones stipulated in the previous 1973 master plan. This master plan has been regarded as 'a conceptually fine blue print' (Susantono, 1998) but still lacking of long-term development goal and once again ineffective on the ground. Currently, Jakarta's 2010 Spatial Plan is linked to Master Plan for Jabodetabekpunjur (Jabodetabek plus Depok, Puncak and Cianjur) under a higher legal basis of a presidential decree.

4.1.2. Urban transport planning and studies in Jakarta

In all the mentioned master plans for Jakarta, transport network plan is always included. The 1953 outline plan which was ratified as a master plan in 1967 was the first to use the

inner ring road as a boundary. The 1973 Jabotabek master plan included the development of major arteries mainly that spanning north to south, and the extension of Jakarta's main thoroughfare Jl. Sudirman-Thamrin. Nevertheless, not until 1974 was there a separate transportation study for Jakarta municipality that suggested the need for a mass rapid transit system, including the construction of subway lines as part of the public transport. This study, the Metropolitan Area Transportation Study (JMATS) was conducted by Germany's Arge Intertraffic Lezt Consult (Arif, 2002).

Since then, the plan to integrate road-network and an MRT system has been the center of many following studies, all of which use the Urban Transport Planning[6] (UTP) method (Arif, 2002). There are:

- 10 studies sponsored by The World Bank
- 4 studies sponsored by the JICA
- 2 studies sponsored by the Japan Technical Communicators Association (JTCA)
- 1 study sponsored by German's Gesselschaft für Technische Zusammenarbeit (GTZ)
- 1 study sponsored by the United States Agency for International Development (USAID)
- 1 study by the National Planning Board (Bappenas)
- 1 study by the Ministry of Transportation (Dephub)
- 3 studies by the Agency for the Assessment and Application of Technology (BPPT)

Most of the studies suggested that Jakarta municipality needs to increase the capacity of the city's roads and provide a high capacity transit system based on calculations of increasing travel demands. MRT was suggested as it has been widely used in developed cities. There were also proposals for improving the bus system, the most prominent being a proposal from BPPT, which had been tried out as a pilot project along Jl. Sudirman-Thamrin although only for a very short period.

[6] Urban Transport Planning (UTP) is a planning system developed at the end of the 1960s in the United States. It uses modeling techniques based on the aggregation assumption that trips are generated from the land use system with an employment base (Arif, 2002).

Arif (2002) in her assessment of six of the most prominent studies mentioned earlier revealed that the proposals from these studies lack an understanding of the complexity of transport development in Jakarta, which involves 5 national level government institutions and 7 city level agencies, and thus lack strategies to 'transform plans into reality'. (Arif, 2002: 381)

They have also relied too heavily on computation modeling, focusing too much on increasing capacity and reducing travel time, thus homogenizing reasons for travel and are sterile from aspects like affordability of MRT. Several studies that suggested bus reform tend to opt for increasing fleet, licensing scheme and the self-correctional nature of the market.

From all the previously mentioned studies, one that is currently used as the basis for transport master plan is the Study on Integrated Transportation Master Plan for Jabodetabek (SITRAMP) 2004 conducted by Pacific Consultants International Almec Corporation (PCI Almec) under the directive of JICA and Bappenas. This study suggested policy strategies for public transport promotion, traffic congestion alleviation, air pollution and traffic noise reduction, and safety and security improvement. It sets a timeline until 2020 for the completion of several projects that includes among others (JICA, 2004):

- busway development
- road widening, completion of the first and second outer ring road, and two additional toll roads
- train double-tracking
- railway station and signaling improvement
- bus reform
- north-south subway line
- vehicle inspection enhancement and fuel tax increase

From the mentioned projects, Jakarta municipality along with the national government is currently placing its priorities on (DKI, 2008):

- completion of all 15 busway corridors
- subway construction
- six additional toll roads

- continuation of monorail construction, a project that was not included in SITRAMP 2004 but was added to Jakarta Transport Network Plan in the city's master plan

4.2. Reality check on urban transport network

Jakarta's urban transport network could be traced back to the colonialization era. In the late 1860s, as more sophisticated form of horse-drawn tram was introduced, both for passengers and goods, the development of road structure started. Later on in 1873, the first railway line stretching from north to south between old Jakarta and Buitenzorg (Bogor) was built mainly to accommodate the movement of goods.

As soon as trams were introduced in the Netherlands, it was also brought to Jakarta. The electric-streetcar service was introduced on April 10, 1899, a step forward from the wagons city residents were using. The colonial city was probably among the first in the region to have such a modern system. The tram, along with other transportation services, was managed by Bataviasche Verkeers Maatschappij (BVM). By 1909, 14 kilometers of tram lines snaked through the city (Interview with Adjie Damais, 2007). A few years before Indonesia's independence, the service had grown into five lines. The longest ran from North Jakarta's Pasar Ikan to East Jakarta's Kampung Melayu. Others served Harmoni-Menteng, Jembatan Lima-Kramat, Pasar Ikan-Tanah Abang and Tanah Abang-Jembatan Merah. The system's decline started during the Japanese occupation of 1942 to 1945. Slowly other means of transportation, including public minivans and pedicabs, were taking over. (Febrina, 2007)

Much later after its independence, what used to be the most sophisticated means of mass transport in its era was deemed obsolete, demolished and replaced by buses. This takes place during the early 1960s. Nas and Malo (2000) pointed out that then Indonesian president Soekarno decided that trams 'did not fit the image of a modern city because they were not underground' (Nas and Malo, 2000: 233). However, the government also did not have sufficient financial resources to build underground trains and thus the tram lines were simply buried under an asphalt layer as roads along the lines were widened. Then Jakarta governor Sudiro proposed to keep two tram lines connecting trading areas (Jatinegara and Senen), but the proposal was declined by the central government (Nas and Malo, 2000).

As Indonesia was then aligning to the Eastern bloc, most of its first buses were of Eastern European manufacturers such as Robur and Ikarus.

As demand for getting around surpassed the supply that the limited number of available buses could accommodate, paratransit grew larger in scale. One most common form is '*oplet*'. '*Oplet*', a word easier pronounced by the Indonesia tongue than its original term 'autolet', is a form of transport in the shape of locally assembled cars. Their engines were of old cars made in the 1940s and 1950s such as Austin, Moris Minor and Fiat, while the body is locally made of wood (Interview with The Jakarta Bus Society, 2008).

Car had already been introduced to the city streets since early 1920s, but its ownership had not really picked up until later in the 1970s when the country embraced industrialization through automotive manufacturing. While seen as a geographically strategic base for manufacturing by Japanese automakers, Indonesia is at once offering a huge domestic market for the product. And since then, owning a private vehicle, be it a car or a motorcycle, has been almost every family's second priority, after securing a roof above their heads. Between 1970 and 1990, the number of registered car increased six fold (Kenworthy and Laube, 1999).

It was also high in the national agenda to promote this potential domestic market for the sake of securing more foreign investment and providing jobs. The idea of transport infrastructure has been narrowed down to building ring roads, toll roads and arteries, projects suggested by studies and funding from the World Bank and that fell into the hands of those closest to the ones in power to gain profit from. These main thoroughfares are mostly trying to connect commercial areas and in the case of ring-road, trying to create a development belt for the city. The development of smaller connector roads in between, which are less prominent and less profitable, was lagging behind. As a result, the city has quite a gap in road hierarchy. One could travel through meandering narrow alley and ended up in an artery.

While roads were on top of priority, despite studies suggesting MRT since 1974, public transport has not. Since the demolition of the tramline, there were practically no other form of mass transit except for the decaying inner city and commuter train services. Jakartans have to rely on buses or the already growing form of paratransit.

The changes in the form of the city's structure of both urban transport and urban development in general could be seen from the four different visualizations below:

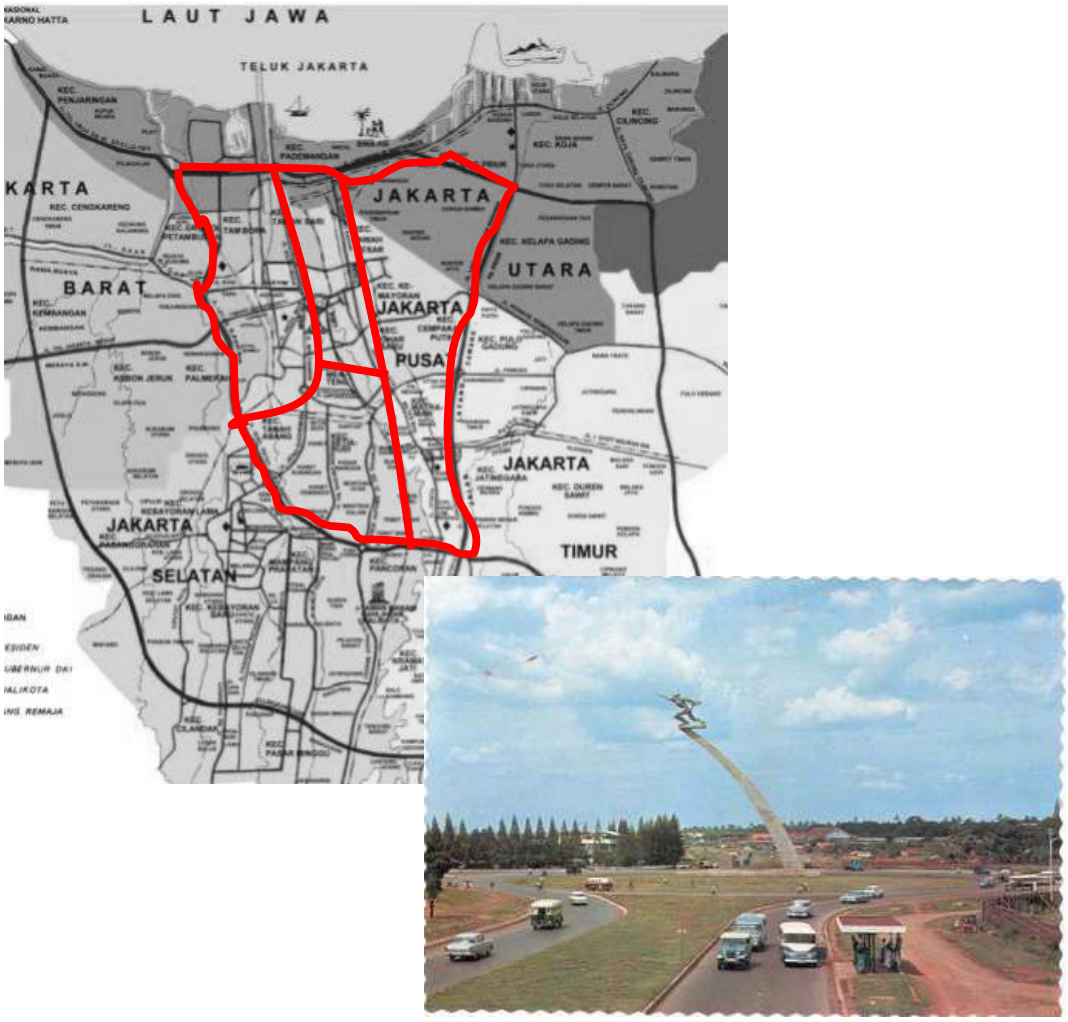


Figure 6. Jakarta in 1970s

Source: Dewi and Febrina, 2007

The red lines indicate the city's primary streets, including its then outer ring road which now becomes Jakarta's inner ring road. The development of road-based culture started from this and later on expands as the city sprawls. The railway is basically that inherited from the Dutch and the tram lines have been scraped. The picture shows the condition of one of Jakarta's Pasar Minggu artery at the point where it intersects with the ring road. Car

ownership has picked up but streets are still relatively empty. Also during this decade, the government set up the state-owned bus company Perusahaan Pengangkutan Djakarta (PPD) and opened the market for private companies to provide large buses, micro buses and minivans. By the end of the 1970s, around 600 state-owned buses and 2,400 private buses and minivans served the city. (Arif, 2002) Meanwhile, other forms of paratransit, mainly those catering to door-to-door travel demand, complement the need for mobility in Jakarta.

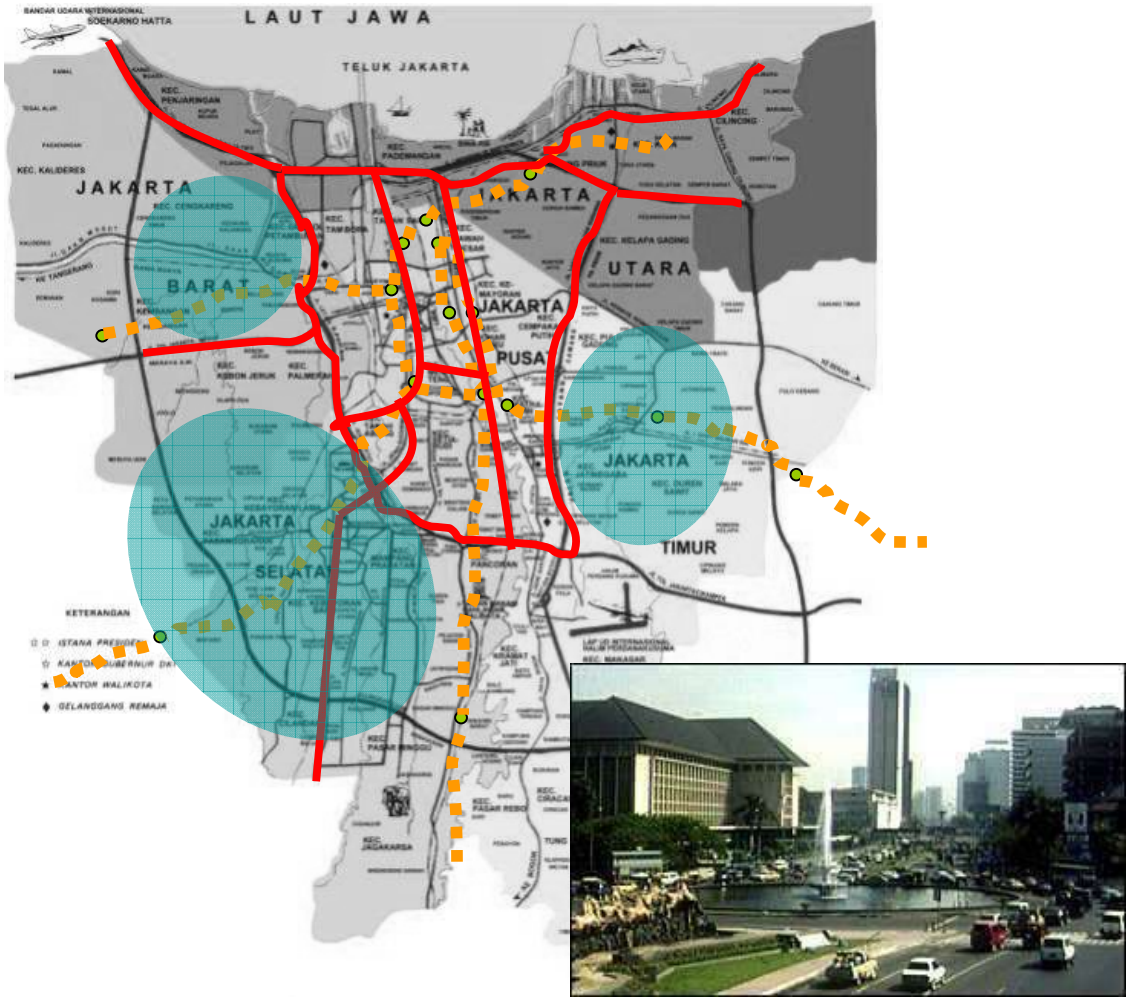


Figure 7. Jakarta in 1980s

Source: Dewi and Febrina, 2007

During the 1980s, settlement area grew beyond the ring-road, mainly in the west, south and east Jakarta, partly because of the extension of arteries to those areas. Housing development is largely led by the private sector, while the government also built several smaller scale residential areas mainly for its employees and for military officers. The picture shows Jakarta's main thoroughfare Thamrin at the point of the city's landmark Bundaran Hotel Indonesia. The means for getting around still consisted of private vehicle, buses, microbuses, minivans and complementary paratransit. It was during this period that more 'modernization' attempt was taken by banning *becak*s and introducing *bajaj*s as replacement (Nas and Malo, 2000).

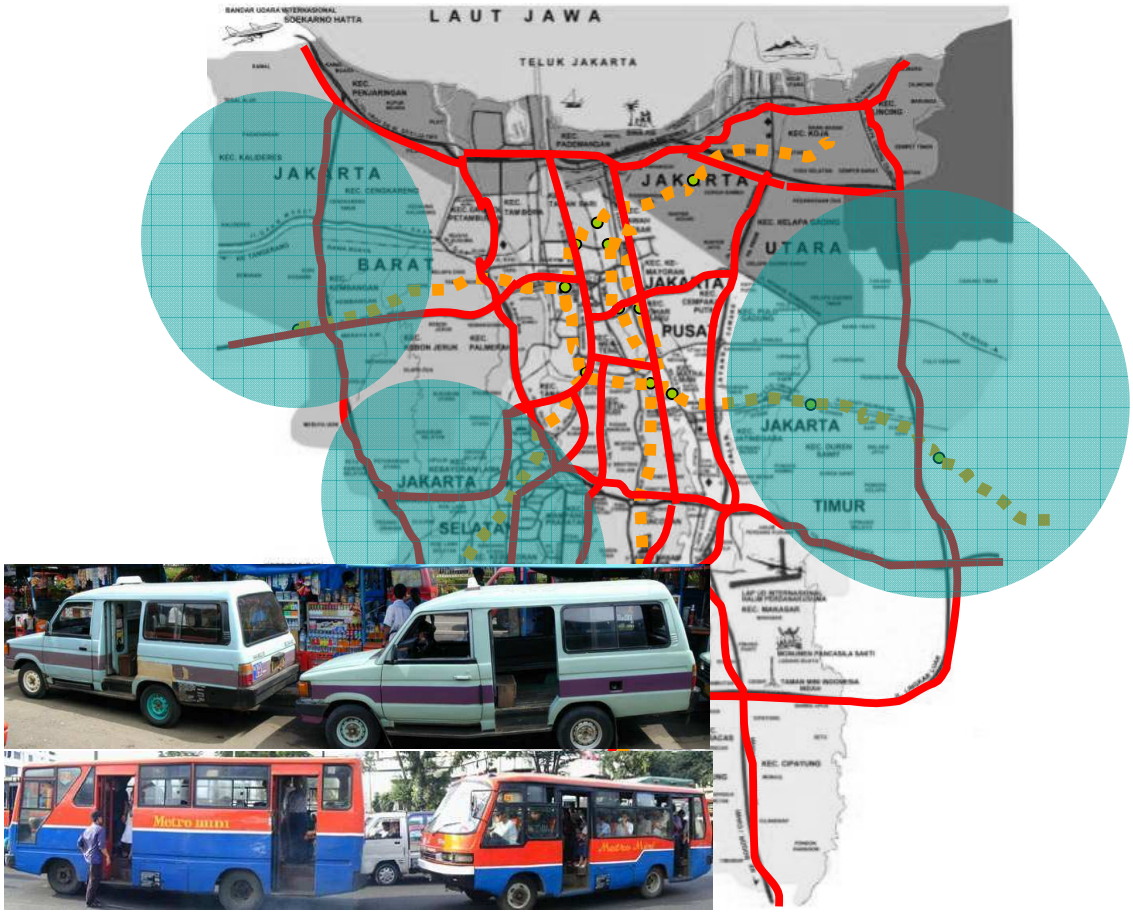


Figure 8. Jakarta in 1990s

Source: Dewi and Febrina, 2007

During the next decade, construction of part of the outer ring road started and more residential area development takes place in a large scale in the eastern part and partially of its boundaries with the northern part, more in the western part and the southern sprawl extended to neighboring Bogor. The city still relies on road network with increasing number of private vehicles and a more informal manner of public transport operation such as public minivans and microbuses in the picture. Train services started to decay.

Susantono (1998), in his research on the relation between land-use change and transport network changes, pointed out that further development of toll roads have a major impact on Jakarta's urban sprawl as indicated below:

	Early 1980a	Mid 1980s	Early 1990s	Mid 1990s
MAJOR TRANSPORTATION CHANGES				
Inter-city toll road network	Southbound toll road opened	Westbound toll-road opened	Eastbound toll road opened	Expansion of tol roads (west and east)
Intra-urban toll road and arterial network	Cipete arterial road, South-Central arterial widened	Two other south-central arterial roads widened	Eastbound and Westbound arterial roads widened	Southern Beltway toll road opened
Traffic congestion pattern	Moderate on many streets	Congestion occurred on major arterials	Flyovers relieved congestions in some intersections	Congestion in down town, suburbs and arterial roads
Railway system	Jakarta-Bogor electric suburban railway operated	Double track railroad for this suburban railway system	Several suburb were renovated	Elevated railroad in downtown area, new cars
MAJOR LAND USE CHANGES				
Downtown city center and financial districts: Intensification of land use in CDB area	Several high-rise building were built around along major corridors of downtown area	. Oversupply of office spaces, sluggish real estate market . High rise apartment began construction	. High rise office construction boom . High rise apartment boom . New retail centers opened in downtown area	. Oversupply of office space . High rise apartment bust . More retail and shopping centers downtown
Beltway corridors (including intra and inter-city toll road): Development along the	Residential areas for government officials, military and several other public housing built along the corridor	Real estate developers began building large housing complexes around major interchanges	. Office buildings built along beltway, high occupancy rate . Several apartments built along beltway	. Continuing development of office and apartments along the beltway . Several new towns are built in

corridors			. Massive construction of housing in south, east and west	south, east and west
Suburbs			Housing demand skyrocketed	Price for medium housing is stable

Table 5. Major changes in urban transport and urban development in Jakarta

Source: Susantono, 1998

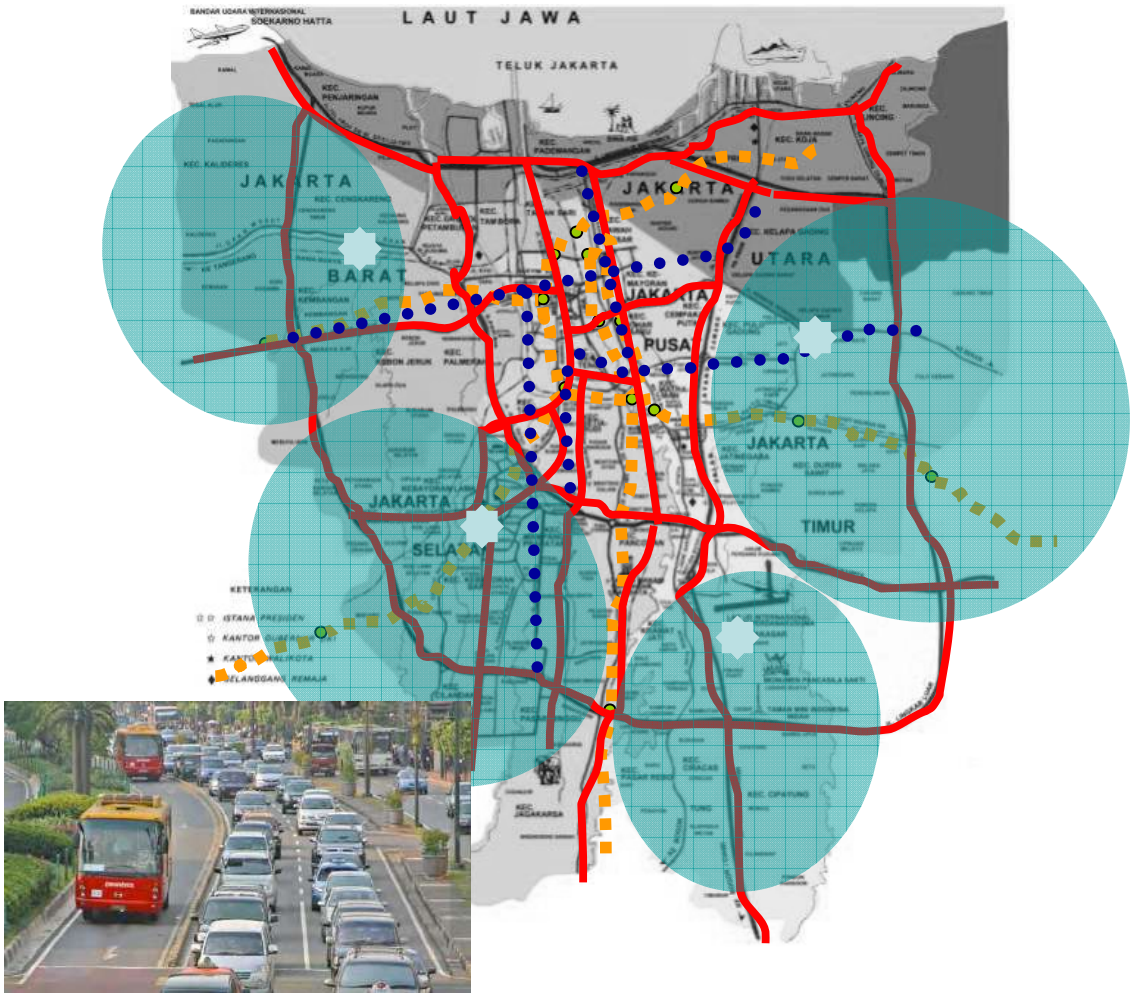


Figure 9. Current state of urban transport network in Jakarta

Source: Dewi and Febrina, 2007

Increasingly sprawling, congested and chaotic can describe Jakarta in the early 2000. Pockets of sprawl grew larger and developed their own center of activities, yet commuter is still increasing. In 2004, BRT was introduced as part of the city's effort to solve its traffic woes and provide better mobility. The system has been up and running and since then grew into 7 corridors, however traffic jam persists and nothing has been done with the existing public transport system. Train services have been slowly improved under the directive of JICA.

4.2.1. Development and realization of studies

Currently, of all the suggested projects both in older studies and the most recent SITRAMP, the most obvious development that takes place in Jakarta's urban transport network is the construction of roads and toll roads. Currently, some 7 percent of Jakarta's urban area is dedicated for roads. Meanwhile, sidewalks are lagging behind. As of 2006, it spans only half a million meters as compared to the 6.5 million length of road constructed (BPS, 2007).

Road criteria	Length (m)	Coverage (sqm)
Toll	112,960	2,472,680
Primary artery	112,149	2,140,090
Primary collector	51,630	671,384
Secondary artery	502,640	8,299,089
Secondary collector	823,913	6,970,938
Municipal street	4,936,928	20,988,103
Total	6,540,221	41,542,286

Table 6. Road span in Jakarta

Source: BPS Jakarta, 2006

Meanwhile, improvement of the urban transport network has largely been led by JICA with financial assistance in the form of loans from the Japan Bank for International Cooperation (JBIC). This financial resource was dedicated for railway service improvement and maintenance.

MRT

The Japanese government has also been active in plans for the development of MRT. In 1995, the national government, city administration and an Indonesian-Japanese-European consortium signed the Miyazawa Plan and Special Yen Loan Program. Plans for the MRT construction was finalized in 1996, but then delayed by the economic crisis. The proposed 15-kilometer line to be built would connect Fatmawati in South Jakarta with Kota in North Jakarta. Financing for the US$1.5 billion project will mostly --70 percent-- come from a Japanese government loan at a 7.5 percent annual interest rate with a maturity period of 40 years and a grace period of 10 years. The plan was revived in 1999, partly due to the push of B.J. Habibie (May 1998-October 1999) to continue the project. (Santosa, 2000). Sutiyoso, the governor at the time, has been a strong lobbyist for this; citing studies that it will save the city an annual US$900 million of losses due to traffic congestion and absorb 60,000 construction workers. Several firms were indicated to be involved in this project (Junaidi, 2001):

- Japanese consortium Itochu Corp.
- German Ferrostaal AG
- Indonesian firms of PT Bakrie Investindo (owned by tycoon Aburizal Bakrie, who was Coordinating Minister for the Economy from 2004-2005), PT Bukaka Teknik Utama (owned by the family of tycoon Jusuf Kalla, who is now Vice President), PT Citra Lamtorogung (owned by Siti Hardijanti Rukmana, daughter of former president Soeharto), PT Lippo (owned by Chinese-Indonesian tycoon Riyadi family), city-owned developer PT Pembangunan Jaya , private bus operator PT Steady Safe and PT Suhamthabie (owned by then president Habibie's youngest brother)

The plan, however, was officially opposed by the World Bank which asked the government to review the project. Transportation NGOs and economists commented that the project was too costly (Interview with Pelangi Foundation and transportation expert Darmaningtyas, 2008).

It was once again stalled until revived in 2005. The total cost is now estimated at US$767 million, with a local funding contribution of US$249 million (Simamora, 2006). Changes are

made from the initial 1996 plan. The MRT will connect Lebak Bulus in South Jakarta and downtown Kota along a 14.3-kilometer line. Despite being called a subway line, 70 percent of it will actually be on ground.

A year later, the Japanese loan agreement was once again made official by President Susilo Bambang Yudhoyono and US$16 million was disbursed for preconstruction work, this time at an annual interest rate of 0.4 percent. It has been agreed that 10 state enterprises and 5 private firms were to join the project consortium, annulling the ones named in 1999 except for Kalla family's PT Bukaka Trans System (Simamora, 2006). Not long after, another dispute over the percentage of local contribution delayed it once again. Bappenas insisted that 75 percent of the value of the project would be gathered from local funding resources on the argument that the project would then not rely heavily on Japanese technology.

In early 2007, this unclear tug-of war between interests was finally settled. The Value of the project has changed once again to US$800 million, of which now 85 percent would be funded by the Japanese Loan to be paid back 42 percent by the national budget and the rest from Jakarta city budget. Jakarta municipality has already formed city owned company PT MRT to start construction in April 2008 (DKI, 2008). The design phase is to be completed by the end of 2009 and construction to kick off in 2010. It is expected to start operation in 2015 (Interview with Jakarta Transportation Agency, 2008).

MONORAIL

Although this mode of transportation has rarely, if never, appeared prominent in previous studies, elevated light transit or more widely known as monorail suddenly appear in the discussion of solving Jakarta's traffic woes. Plans and serious study for this has not taken place until 2003. The plan envisions two lines totaling in 27.8 kilometer of track serving mostly business district Kuningan and Sudirman in South Jakarta and running through to western commercial center of Grogol and southeastern commercial area of Tebet and Kampung Melayu.

PT Indonesia Transit Central (PT ITC) -- in which former president Soeharto's daughter Siti Hardijanti Rukmana was involved along with state road developer Bina Marga ex-director -- first signed a memorandum of understanding with MTrans Holding Sdn Bhd, developer of the Kuala Lumpur monorail. Despite being a private business, the event was taken to a government-to-government level with the attendance of Malaysia's then Prime Minister Mahathir Mohammad and Indonesia's then President Megawati Soekarnoputri. This agreement on cooperating with Malaysia was later cancelled and PT ITC joined hand with Singapore's Omnico Group by forming PT Jakarta Monorail (PT JM), a company which received a 30-year concession in May 2004 to build the project estimated to be worth US$650 million and operate monorail in the city by the end of 2006. This company is supported by local companies PT Adhi Karya, Global Profex Synergy and PT Radian Pilar Pasifik, as well as foreign companies under the Omnico group (Singapore Mass Rapid Transit, Singapore Technology Electronics and Japan's Hitachi) (Interview with PT Jakarta Monorail, 2008). PT JM proposed to use Japan's Hitachi technology, while saying that it was also considering South Korean's Maglev and China's Citik. During this technological assessment, PT JM already started the construction of monorail foundations.

In several months, the investor involved changed again as PT ITC signed an MoU with another local consortium consisting of PT Bukaka Teknik Utama (owned partly by family of Vice President Jusuf Kalla), state-owned rolling stock company PT INKA, state-owned electronic company Lembaga Elektronik Negara (PT LEN) and PT Siemens Indonesia. The option for the chosen monorail technology has since been replaced by Germany's Siemens. As a response, Omnico then retreated from PT JM (Nurbianto, 2007).

With the resignation of Omnico, PT JM lost its funding sources and in August 2005 the construction of monorail foundation came to a halt. Half finished pillars are still now standing in the streets where an LRT should have operated above. PT JM then sought for loans from Dubai Islamic Bank, which demanded for a passenger shortfall guarantee from the government. This was approved, but still after the passenger shortfall guarantee, Dubai asked yet again for an asset guarantee from Jakarta provincial government, of which the latter refused to grant (Interview with PT Jakarta Monorail, 2008).

The Jakarta administration proposed a bail-out for a reasonable price and take over the monorail project. PT JM stated an amount of around US$50 million as the value of investment it had already spent for the initial planning phase and foundation construction. This value was assessed by transportation experts who stated that it was very unreasonable (Asrianti, 2008).

Until today, funding resources to continue the project is still uncertain. News articles cited interests from a consortium of local banks to provide up to 70 percent of the project value, but there had been no follow up. The most recent development is that the World Bank is providing grants to carry out a due diligence study and that monorail's blue line route is to be converted to an MRT line.

4.2.2. Current means of getting around and its development

While plans for MRT and monorail are still either in its initial stage or under uncertainties, Jakartans are left to continue their daily activity using cars, motorcycles, public buses and minivans and several other form of paratransit. Dependence on private cars and motorcycles is growing as more and more commuting trips are taking place with a limited option of public transport. As of end of 2007, the total number of motorized vehicles in Jakarta has reached around 5 million, with a daily addition of 269 new cars and 1,035 new motorcycles (BPS, 2008).

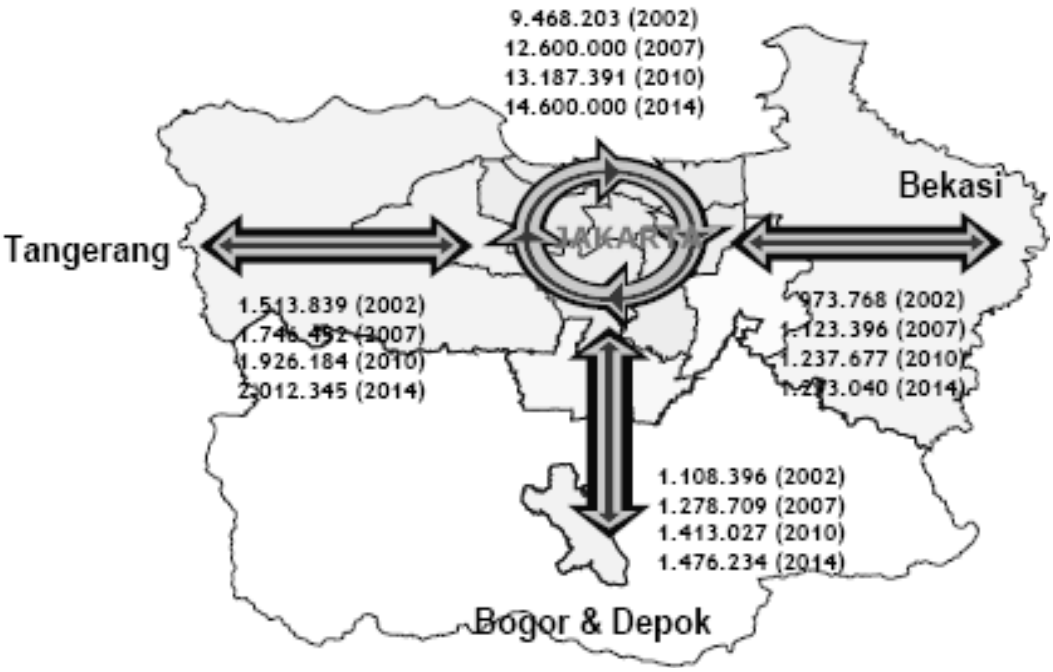
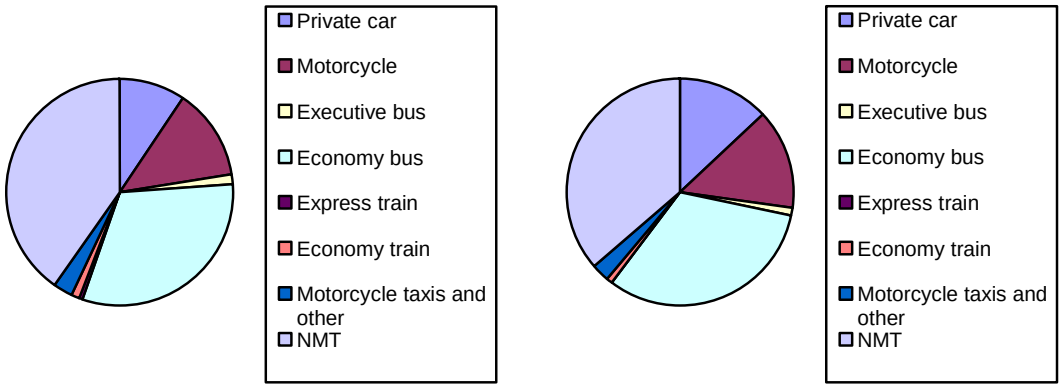


Figure 10. Number of daily trips in Jakarta and Greater Jakarta

Source: JICA, 2004



Greater Jakarta **Jakarta**

Figure 11. Greater Jakarta and Jakarta modal split (BRT excluded)

Source: JICA, 2004

Travel distances have also increased as indicated by the chart below:

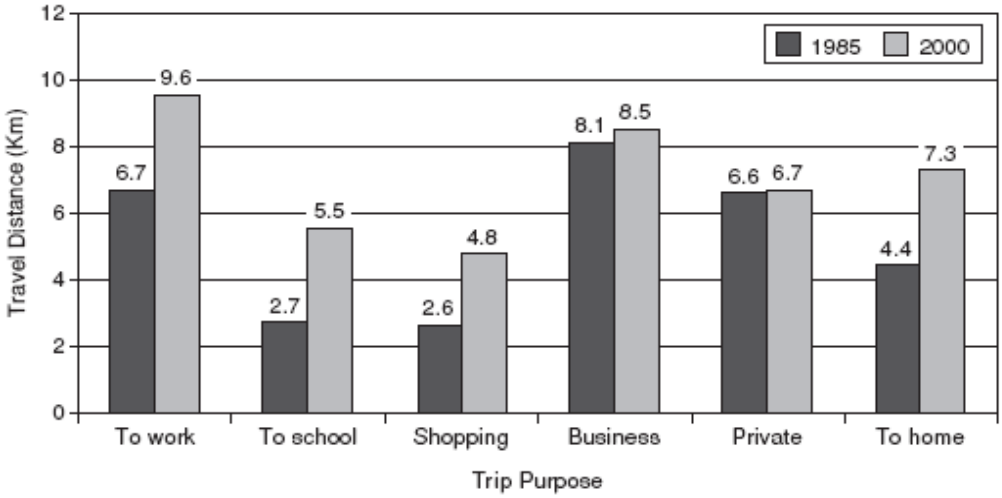


Figure 12. Change in travel distance 1985-2000

Source: JICA, 2004

4.3. Characteristics of current means of getting around in Jakarta

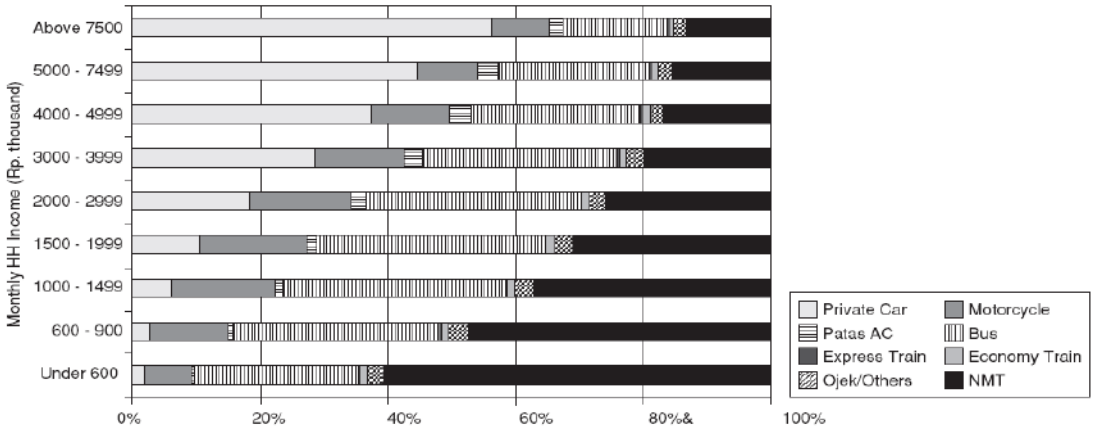


Figure 13. Modal share by household income (BRT excluded)

Source: JICA, 2004

The above chart portrays who are moving around with what. It shows that private car is the domain of the middle upper class and NMT is the domain of those with income level below the official minimum wage in Jakarta. Meanwhile, a significant portion of the middle-lower to middle class utilizes train and public buses.

For the purpose of further analysis, characteristics of current means of getting around in Jakarta are differentiated as:

1. Private vehicle consisting of private cars, motorcycles and bicycles
2. Public transport consisting of train, bus rapid transit, public buses, public minivans, and door-to-door paratransit (motorcycle taxis, bajaj, becak)

4.3.1. Private vehicle

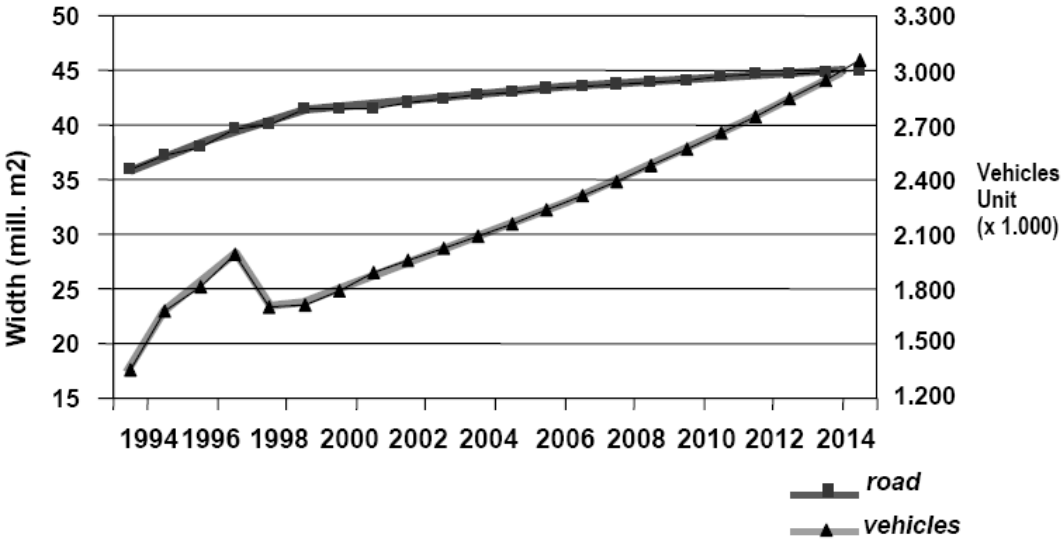


Figure 14. Growth of motorized vehicle in Jakarta

Source: JICA, 2004

Freedom, flexibility and status are the things that private cars and motorcycles offered. Those characteristics made it so appealing for Jakartans to, whenever they can, use their private vehicles.

Between 1970s and 2000, cars still ranked number one in terms of growth. After congestion got worse in Jakarta's streets, most – even car owners – are buying motorcycles. Ownership of both is also made easy by banks offering consumer credits for vehicle purchase with a very low down payment.

Up until recently, private vehicles have been the most accommodated mode of transportation in Jakarta. It was not until 2003 that efforts to reduce their use with the introduction of the "three-in-one"[7] regulation. One that was seen as a failure, as car users hire jockeys to be able to enter the regulated zones. Talks are up again for more policies.

4.3.2. Public transport

4.3.2.1. Commuter and city train

Jakarta's train network is one inherited from the colonialization era and then improved in the 1980s after the completion of the Jakarta Metropolitan Railway Transportation Plan under the assistance of JICA. Improvements made are mainly electrification, procurement of carriages, improvement of tracks and modernization of supporting facilities. (JICA, 2004).

Currently, there are four commuter train lines, connecting Serpong, Bekasi, Bogor, Tangerang with either Manggarai station in South Jakarta or Kota station in Northwestern Jakarta. A new line has recently been open, one that runs clockwise inside the city. All combined lines carry daily around 58,000 passengers. These lines are operated by state-owned company PT Kereta Api (PT KA), which also operates inter-city trains, and contributes some 8.5 percent to the company's total revenue (Interview with PT KA, 2008).

[7] The "three-in-one" regulation stipulates that each private car entering certain designated zones (Jl. Sudirman-Thamrin and Jl. Gatot Subroto) in Jakarta at carry at least three passengers –including the driver—during weekdays' peak hours (6.30h-10h and 16.30h-19h).

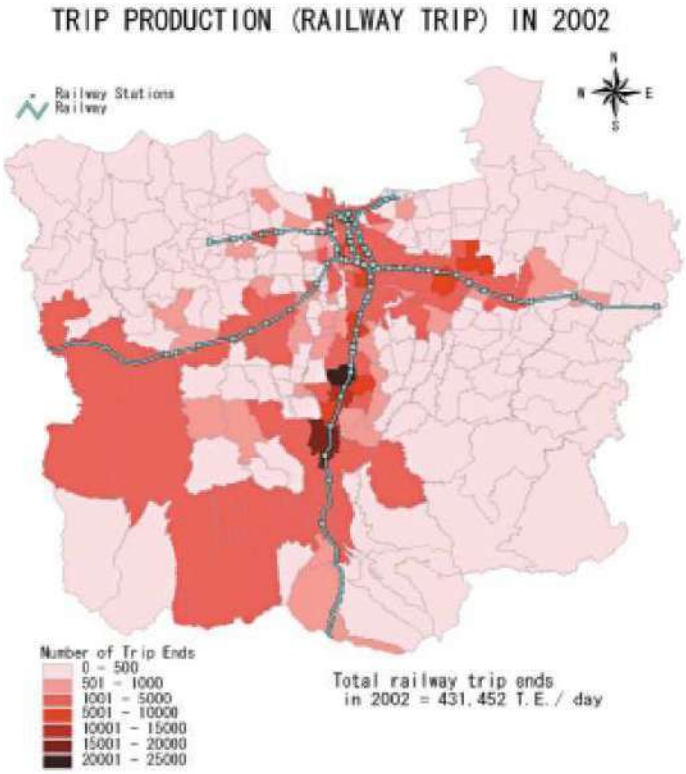


Figure 15. Railway trip in Jakarta

Source: JICA, 2004

Travel with this mode is mostly linked with either motorcycle taxis or public minivans that often crowd corners in front of train stations. It is not until recently that train service is connected to BRT in Sudirman/ Dukuh Atas station, mainly because passengers boarding and alighting here are workers in offices along BRT's corridor 1.

Fees for train services are divided into two classes: IDR1,000- IDR2,500 for economy class and IDR5,000-8,500 for executive class. While executive train is more comfortable for middle-class passengers it does not come as often as economy ones and does not stop at all stations. During peak hours, economy trains are unbelievably packed, with passengers dangerously spilling onto the sides and riding on top of the carriage.

Tickets are issued manually and on-board check is rare or if there are any, bribery becomes the solution for those caught without one. This performance inefficiency has

nurtured the existence of the so-called ‘free-riders’, prompting significant loss to the company.

Despite its mass scale, train service is actually the first transportation mode to have a community-initiated consumer group. What started as a group of five train passengers, who often meet in Sudirman / Dukuh Atas station, grew into a lobby group for service improvement under the name of KRL-Mania, which has pushed PT KA to deal with corruption on-board, increase the frequency of several lines and start posting their schedule on-line.

4.3.2.2. Bus Rapid Transit

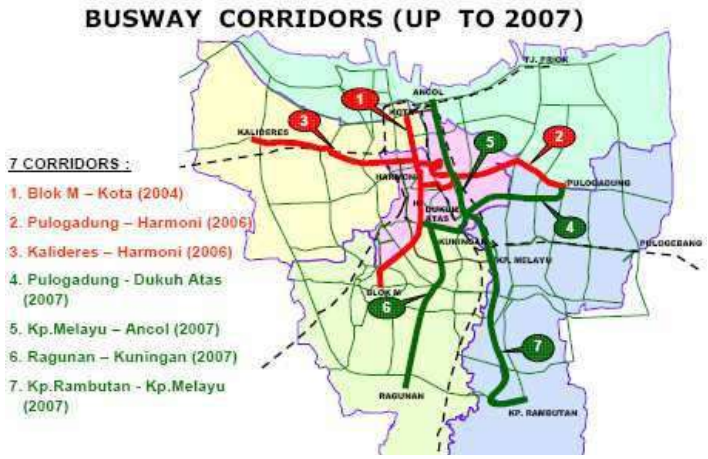


Figure 16. Bus rapid transit corridors in Jakarta

Source: ITDP, 2005

BRT is the newest public transport mode introduced in Jakarta, drawing inspiration from Bogota’s Transmilenio. It is a realization of plans sounded since 1989 on a World Bank-funded study of bus priority. Initial phase started in 2002 resulting in 15 planned corridors, and as then Governor Sutiyoso insisted that at least half of them were built before the end of his term, by January 2004 the first corridor already kicked off.

The development of TransJakarta is perhaps one that does not stir that many upper level controversies as compared to MRT and monorail, at least not involving that many piggy-

backing interests. The controversy it stirs is mostly open in the public domain, about private car owners complaining that their space is taken, route streamlining of existing buses and the cutting down of trees along Jl. Sudirman-Thamrin. Or perhaps it is due to the fact that feeder services have not been integrated.

The plan for BRT is endorsed by academicians and the Indonesian Transport Society as it is deemed cheaper but could perform as efficient as an underground or elevated metro system. As of today, 10 out of the 15 corridors have been built, although only 7 are running with a total of 339 buses carrying 240,000 passengers per day (ITDP, 2005).

Little controversy during the planning phase does not guarantee a smooth operation along the way. The first major problem is the fact that it was not integrated to a feeder service as intended. As a result, many are still reluctant to leave their cars or motorcycles at home. A study from Central for Transportation Studies – Universitas Indonesia (CTS-UI) reveals that 9.5 percent of TransJakarta passengers shifted from their private cars to the BRT, while 78.75 percent shifted from conventional buses (ITDP, 2005).

The hasty construction of the corridors has not been followed by a high level of service, many have observed. This first corridor was constructed rather hastily under the command of former governor Sutiyoso, resulting in current management problems. Jakarta Busway Regulatory (BLUD) assigned consortiums based on a contract without any SOP for performance evaluation. Tender problems occurred and there is no legal basis to demand for better level of service. Currently, none of the BRT corridors are being served by enough buses to accommodate passenger numbers. (Febrina, 2006)

NGO Pelangi Foundation observed that the BRT service is also still lacking supporting facilities and policies like park-and-ride, electronic road pricing scheme as a disincentive for private vehicle and proper sidewalks in all the already built corridors.

Recently, the operation of TransJakarta faces another challenge of private vehicles increasingly occupying the dedicated lanes. This has resulted in more than a dozen of accidents.

4.3.2.3. Public buses and minivans

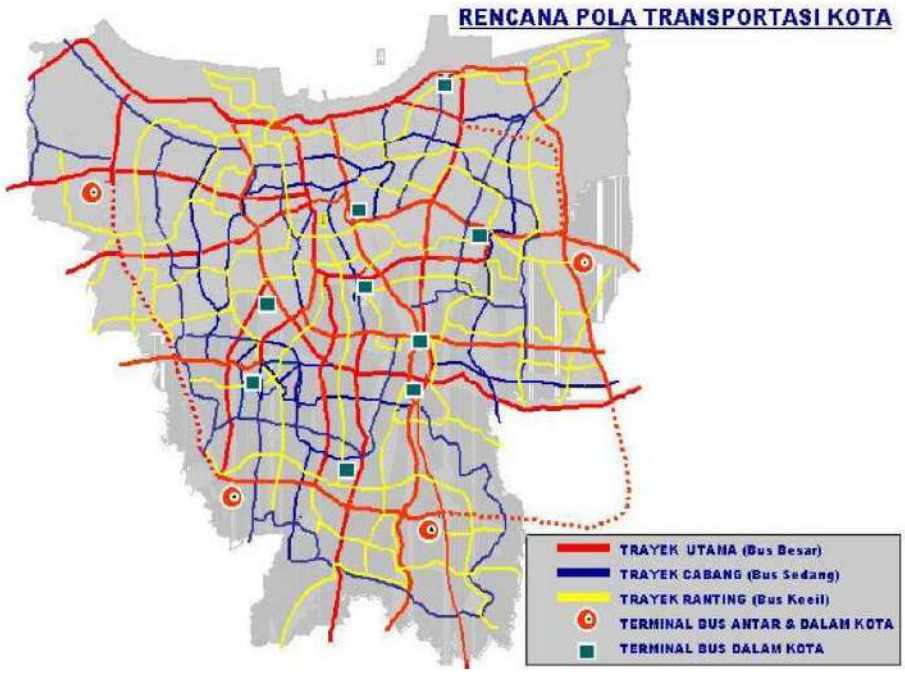


Figure 17. Jakarta transportation master plan (public bus routes and bus stations)

Source: JICA, 2004

Public buses in Jakarta can be categorized by size into large buses (50 seated passengers) and medium-sized buses (25 seated passengers). Before the introduction of BRT, there were 5,411 large buses and 4,981 medium buses, of which only 68 percent were on operation as the rest is in poor condition. (Hartanto and Tahilramani, 2002) As of 2006, there were 4,513 large buses and 4,979 medium-sized buses registered (BPS, 2007). Transportation agency no longer issues additional routes for large buses.

These buses are operated by state-owned bus company PPD and private companies PT Mayasari Bhakti and PT Steady Safe. These large buses serve long distance trip, usually from one large station to another, through main thoroughfares and major arteries, including that along the inner ring road. Fees currently range between IDR 3,000 for non-air conditioned buses to IDR 5,000 for air conditioned ones. Fares for all types of buses, including minivans are set by the Transportation Agency.

Unlike the two private companies that now expand their businesses by joining BRT consortium, state-owned PPD is on the brink of bankruptcy due to mismanagement. It now relies on IDR 2.3 billion monthly subsidies from the government as it has continuously suffered losses (Interview with PPD, 2008).

Drivers of these buses are employees of the companies and receive monthly salaries. However, in practice, sometimes they rent out the buses to illegal drivers. During their operation, drivers are supposed to only stop in designated bus stops, but this is often violated.

As these buses serve mostly in major arteries, this mode is linked to the minivans and micro bus services. Large buses are designated to certain routes and stops, while minibuses and minivans have only the former and thus are deemed to stop on call from passengers or in spots agreed by the cooperatives.

The nature of operation of micro buses under PT Metro Mini and cooperative Kopaja (plus three other small operators) is slightly different. The service started in the 1980s, under then Governor Ali Sadikin, as a response to providing public transport in narrow streets that large buses could not enter. Providers are then granted with route licenses valid for five years (PP No. 41/1993;Kepmen No. 68/1993; Kepmen No. 15/1996) and are allowed to sublet them to individual bus owners. These buses are serving shorter routes on collector roads.

Route licenses are valid for five years and can be proposed by state-owned company, private, cooperatives and individual at supposedly no cost. There is no tender process in granting these licenses, prompting in an uncontrolled service quality and overlapping routes.

As a result of route subletting, one route can involve a lot of individual owners, the number averages between 20 to 56 individual owners per route (Various interviews with fleet owners, 2008).

Individuals interested in owning and operating a microbus usually have to set aside an initial investment of IDR 330 million for a bus and an additional IDR 40 million as a ‘permit’

fee to either PT Metro Mini or Kopaja. Unlike large buses, these micro buses are locally made, using the engine of 4300cc medium light duty trucks manufactured in Indonesia by Mitsubishi, Isuzu, Toyota or Daihatsu and later assembled into ready-to-run micro buses by local assembly garages. Spare-parts for these buses could easily be found in automotive markets or tailor-made in the assembly garages (Interview with PT Metro Mini, 2008).

These buses are then rented for a daily fee of IDR 200,000 to drivers. Owners and drivers are usually of the same ethnicity. Fees for these buses are set currently at a flat rate of IDR 2,500 and given directly to the driver's assistant without any given tickets in return. An observation in 2008 along the Cinere-Blok M route reveals that one trip generates IDR 120,000 and a day makes up for about 7 trips. Two alternating drivers and assistants can go home with an everage of IDR 70,000 a day after fuel expenses and 'other' costs.

These 'other' cost consists of illegal levies for the so-called 'timers' (the man who waits at bus stops to inform drivers how far away the last bus is or helped called out passengers) and thugs in bus stations. These timers are needed since drivers are trying to maximize his income of the day, competing with dozens other buses serving the same route. This so called 'war for the penny' is the result of the daily rent policy from bus owners. Meanwhile, bus owners argue that their daily rent policy was the result of unaccountable drivers that never transparently reveal their daily earnings for a fair profit sharing.

Aside from timers and local thugs in bus stations, several other middlemen are involved in the operation of microbuses: those taking care of business with the police when drivers get tickets for traffic violations and those taking care of road-worthiness tests twice a year.

Having their driving license taken is not a problem for drivers, since the first type of middlemen who have been paid by the route coordinator will bribe traffic police to get the licenses back without having to attend court session. Interviews have yet revealed how much money is involved in this.

The second one, middlemen for road-worthiness test could be easily observed in action in two main test centers in East and West Jakarta. Their job is to 'guarantee' that buses pass

the test despite bad condition. A relatively healthy bus is levied IDR 400,000 and an extra fee of IDR 50,000 exists for each problem found. This illegal income – since the fee of road-worthiness test is only 300,000 for buses and 200,000 for minivans – is shared between the middlemen and officers at test centers (Febrina, 2007).

Smaller-sized fleet of minivans which amounts to more than 12,000 (BPS, 2006) operates in the same way micro buses do. They were also introduced during the 1980s along with micro buses as modernization efforts of the old *oplet*. There are three big cooperatives acting as 'umbrella organization' namely Koperasi Wahana Kalpika (KWK) serving South Jakarta and its suburb, Koperasi Pengangkutan Mikrolet (Kopamilet) serving West Jakarta and its suburb, and Kopami Jaya serving Central and East Jakarta (DKI, 1991).

Initial investment for a minivan ranges between IDR 40 million to IDR 100 million, depending on the type of vehicle and whether it is new or second hand. Public minivan service typically uses adjusted Suzuki Colt or Toyota Kijang, both are locally manufactured and later on assembled to suit the need of the service. Permit fee for public minivan is paid in the form of monthly payment to the cooperation.

Maximum fee for this service is set by the Transportation Agency (DKI, 1991). It currently stands at flat fare of IDR 5,000, but cooperatives often break it down according to rough calculation of kilometers traveled. In reality it varies between IDR 2,500 to IDR 5,000. Unlike in micro buses, this small minivans that can carry up to 12 passengers require no driver's assistance. Drivers also work in alternating shifts. A day rent amount to IDR 70,000 and each driver usually go home with an average of IDR 30,000 after fuel and 'other' expenses (similar like the ones for micro buses).

Unlike in the business of micro-buses, there is rarely ethnicity issue. Drivers are mostly relatives of friends or neighbors of the owners. Aside from minivans, there still exists similar service but more limited to narrow alleys under the name of *bemo*s and *toyoko*s. They total to some 1,500 vehicles as of 2006 (BPS, 2007). This service is more informal than minivans since they have no legality, but operates in the same quite structured way as minivans. They are what remain of the *oplet* era.

4.3.2.4. Door-to-door services

Door-to-door transport service in Jakarta ranges from exclusive taxis to the limited number of remaining *becak*s in the suburb and bicycle taxis in North Jakarta. Taxi services are provided by private companies, with PT Blue Bird being the largest. As of 2006, the number of registered taxi reported by BPS Jakarta (BPS, 2007) reached 1,072, but many said that it has surpassed 3,000 as companies obtaining licenses in neighboring Depok, Tangerang and Bekasi are also operating in the city. Taxi services cater to the middle upper class in mostly non-peak hour time and their fare is still set by the Transportation Agency.

Meanwhile, despite sharing the same name, motorcycle taxis are one that operates informally. Until today, they remain unregistered and fee is whatever agreed between the driver and the passenger. Motorcycle taxis are increasingly operated by owner-driver as owning a motorcycle has been made easier by consumer credit similar to that offered for cars: low down payment and simple requirements. Despite being operated by owner-driver, there exist pool associations which regulate turn for driver in queue for passengers. The service that motorcycle taxis are offering is similar to the role of becak until it was banned. But, since they can travel relatively further and have greater maneuverability in traffic jams, their service increasingly becomes the competition of sedan taxis. Typically, motorcycle taxis could be found in front of housing complexes, alleys leading to collector streets and secondary arteries. But, since the introduction of BRT, they can be found lining just beside the end of the ramp of crowded TransJakarta stations.

An older version of motorcycle taxi is the bicycle taxi. They exist in a very limited number uniquely only in North Jakarta.

Bajaj is another form of door-to-door service. It was introduced for replacement of becaks. It derives its name from the brand of Bajaj, manufacturer of the three-wheeled vehicle. Despite being restricted to the periphery of the city, their number still adds up to more than 14,000 (BPS, 2007). They typically have the similar structure of operation as minivans, with individual owners paying permit fee to cooperatives and drivers paying daily rent to

owners. *Bajaj* can mostly be found in South, West and Central Jakarta, lining up in front of traditional markets.

While in the 1980s it was deemed modern, it has now stepped down to second-class transport option which is noisy, uncomfortable and pollutes the air with their two-stroke engine. Several 'modernization' efforts have been done including replacing them with locally manufactured '*Kancil*'. It was not deemed successful and later on Jakarta administration shifted to replacing old *Bajaj*s with imported new gas-powered ones manufactured also by *Bajaj*, the Indian company.

The last form and most marginalized door-to-door service is *becak*. This human-pedalled passenger transport has been banned and now only operates in limited number in suburban areas south of Jakarta. Since more and more motorcycle taxi enters the market and line up in front of traditional markets and housing complexes in the suburbs, *becak*s role as short-distance is increasingly diminishing.

5. ACTORS AND HOW THEY SHAPE URBAN TRANSPORT NETWORK IN JAKARTA, INDONESIA

Observing the complicated process of how Jakarta's current urban transport network is shaped, it has become all the more obvious that transportation issue is one with more political tendencies rather than mere application of technicalities, which is already complicated. It is highly marred with conflicting interests that complicates the process even more. Technology indeed plays an active role in the process. Seen from the perspective of analysis explained in Latour's methodology, it has become the non-human mediator that shapes association of interests and changes those interests along the process of transport development.

This chapter will try to employ further the chosen framework analysis to trace the forming and reforming of associations of interests and try to point out when and where technology becomes the mediator in the shaping of urban transport network in Jakarta.

5.1. Analysis of urban transport network planning process

The image of a capital city where its inhabitants are moving about in their private vehicles in wide roads, boulevards and highways is actually one that is preferred by both the Indonesian central government and the Jakarta authority. It represents the image of modernity that the authority is trying to build in order to place Jakarta in parallel with its more developed counterparts. And since it has limited capacity to independently finance the desired development, it has to rely on foreign loans.

This is where interests from different actors came in. Part of the approach used to justify offered foreign loans (predominantly from the World Bank and Japan) for road and highway construction in Jakarta is what Latour described as the straight forward strategy. This strategy is possible only when the focal actor is on a stronger position. In the case of Jakarta as a developing city, where financial assistance for development projects are badly needed, outside interests offering exactly that would inarguably be in a higher bargaining position.

But, why would foreign interests like the World Bank and Japan be interested in Jakarta?

Aside from the interests of channeling loans, back in the 1950s and 1960s, there was a tug-of-war between the dominating Western and Eastern blocks. It was still the era of Cold War and Indonesia back then was strongly leaning towards the Eastern Block (China and Russia) despite having led the Non-aligned Movement with other developing countries in Asia and Africa. Loans and assistance from the Western-led World Bank for infrastructure projects including that for urban transport infrastructure was in a way an effort to pull Indonesia to the other direction. The highly political interest is translated into one that would fit Indonesia's own: creating modernity in its capital city.

Carrying along the argument for modernity represented by car-based urban development with the notion of "I want it, why don't you", foreign loans mainly from the World Bank started flowing in with the promise that it will help create the city that their Indonesian counterpart wanted. Since Indonesia has a highly top-down development approach, once this forming of association is stable, the next step would be execution of the plan. During this phase, car-based transport network development planning utilizing UTP as a mediator paved the way.

Technology becomes a mediator since the beginning of the shaping process: planning. Until today, all transportation planning and studies in and for Jakarta still utilize the UTP system; a computer modeling intended to generate road-building solutions for motor vehicle use (Arif, 2002) but then slightly modified to cater to other transport modes modeling needs. Since most of the studies – those which later on became the basis for Jakarta authority in developing its urban transport network -- were conducted by consultants from developed cities (Japan, Germany and the United States), this approach had remained unquestioned.

In a way, UTP, like the image creation of car-based modern city, came as a 'black box', an already accepted technology which remained unquestioned until today despite several criticisms of its utilization. Dimitriou (1992) has argued that UTP is 'applied to Third World cities similar to that in developed countries, which is to justify investment decisions regarding additions to be made to the urban transport network' (Dimitriou, 1992: 184).

Dimitriou asserted UTP as inappropriate since it was initially developed for the style of development in suburban cities in the United States and focused only in answering projected mobility demands with the construction of roads and highways. Thus, it is of no surprise that by relying on such approach in planning its urban transport network, Jakarta became a city highly dependent on private vehicles, one that was indeed intended in the first place.

This phenomenon can be observed during the late 1950s until the early 1960s, when foreign consultants started to assist the Indonesian government and the Jakarta authority in designing the city's first master plan which included the construction of an inner city toll road. It was the kind of assistance warmly welcomed as then President Soekarno wanted to prepare a more modern Jakarta for hosting the Asian Games in 1962.

This tendency for car-based transport network development in Jakarta later on in the early 1970s invited another interest coming from Japanese auto manufacturers seeking to open a strategically located manufacturing base in South East Asia. It went in line with the Indonesian government's interest in starting industrialization and creating job opportunities for its citizens.

These joint interests, along with the previously mentioned, form a strong association which has a dominant say in what should and should not be built within the city's urban transport network.

5.2. Analysis on how planning relates with on-the-ground development

Meanwhile, on the ground, the role of technology can be said to have begun with the introduction of automobile industry. As car and motorcycle manufacturing was introduced to the city, those artifacts began the shape of Jakarta's current road-based transport network. The interests of foreign investors to seek manufacturing base abundant with resources and cheap labor struck the same tune with the interests of the national government to march towards industrialization and secure the provision of jobs.

An industrializing city or country also means a market, as income tends to grow and the size of the middle class increases along. As Jakarta provided both, it has become a strategic place for nurturing private sector and government interests. The local private companies involved in the sector inarguably benefit from this. What initially started as an import and trade business eventually grew into manufacturing empires.

The argument that motorized vehicles are good for development is then translated to the image of modernization that the city administration seeks for its developing city. The notion that private vehicles are good is then black-boxed under the jargon of modernity in mobility. The fact that Indonesia is under an authoritarian government during those eras helped strengthened this process of closing the black-box.

Development to nurture these interests is then catered through mobilizing resources under the disguise of grants and loans to justify the need for continuous road expansion, one that still takes place until today. Road widening projects and toll road constructions were at their peak during the 1980s and early 1990s as they were deemed needed to provide mobility for the increasingly sprawling Jakarta. Highway and road construction also means business, a place for those eventually seeking to gain quick profits from the transportation sector. The nepotism during the construction of the Jakarta ring road, a project led by a company owned by then president Soeharto's daughter Siti Hardijanti Rukmana, is a clear example. Having previously no interests or experience in the sector, she jumped right in and joined the band.

Cars and motorcycles also speak for themselves to the public. They provide greater mobility for people to travel where they want and when they want to. The already constructed image of modernity that it brings also contributes to the push towards wanting to own one's own vehicle as a status symbol. Later on the market is widened by the joining interests of banks to channel consumer credit, a move deemed safer and easier than business and corporate loans.

And all the while, the public transport sector has its own take on things. Left on their own, they start to build their own black-box.

Technology wise, it seems to have been the nature of the public transport providers in Jakarta to tailor second-hand vehicles in a bid to provide transport service on a low initial investment. *Oplet*, the very initial form of public minivans, was created from second hand engines of old imported cars and covered with a wooden body made locally. Until today, similar practices still occur in the micro bus and minivan business. The development of the automotive industry also benefits them in a way, providing cheaper second-hand vehicles. As this sector grows, local assembly garages that previously focus on large buses have another group of customers asking them to build *Metro Mini*s and *Kopaja*s on new or used truck engines. In informal garages, mechanics are getting increasingly skilled to rearrange the interior, polish and spray paint old cars to be used as public minivans, not to mention to adjust engines to perform maximally at a minimum maintenance cost.

System wise, the informal manner of operation of existing public transport is another closed black box. The laissez-faire approach from the government and administration has provided space for this. Since no laws stipulate the basis of granting routes and no mechanisms are set on evaluating them, companies and cooperatives are free to propose new ones and offer theirs to interested individuals who would like to join the business. Just like any other businesses, formal or informal, public transport operators are interested in minimizing cost and maximizing profit. As profits cannot easily be maximized due to a tight fare-setting regime, they opt to minimize cost, which means leaving vehicles under-maintained as it is cheaper to bribe pass the road-worthiness test than to regularly maintain their fleet. Middlemen, rent-seekers and corrupt officials jump in the wagon in closing the black box. At the end of the day, it is those who cannot buy their own cars or motorcycles that become the losers.

All the above traced association and network of interests reach a saturation point. That is when all interests are no longer getting what they want. Jakarta's current traffic woe is that saturation point. And once again technology is sought to provide the answer. It will once again reshape the network.

5.3. Analysis of how technology changes urban transport network and the interests that are involved

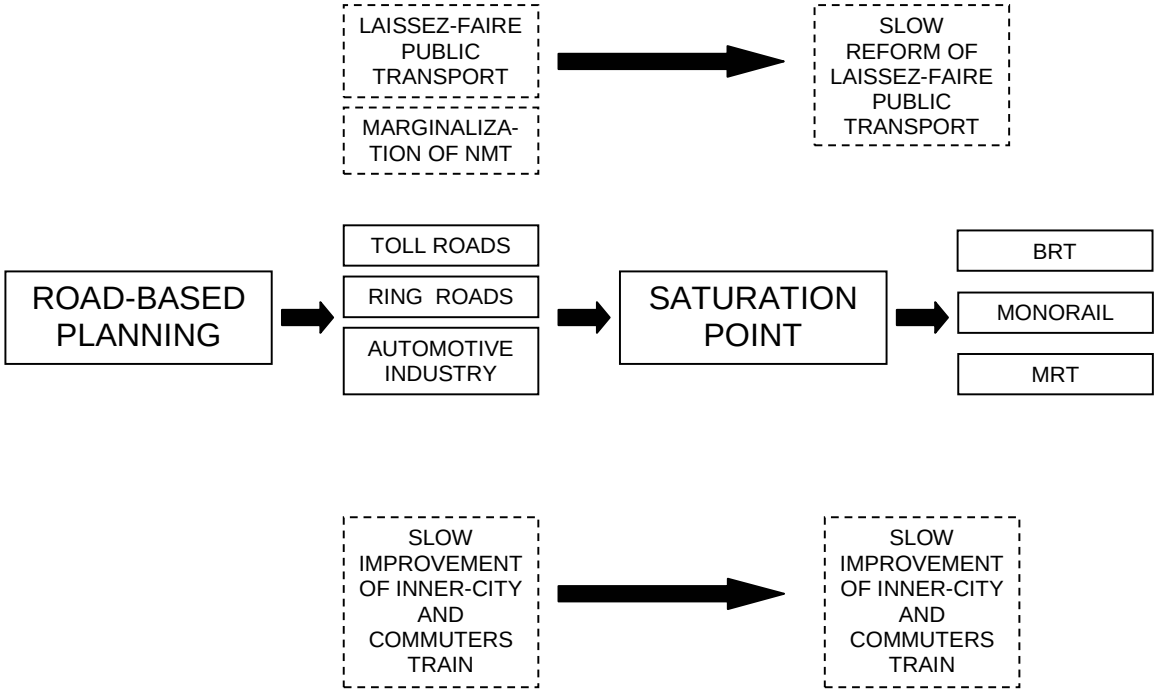


Figure 18. Urban transport network shaping process

The introduction of BRT, MRT and monorail opens again the already associated interests and brings in new ones. Controversies and tugs-of-war surrounding plans for the construction of the MRT and monorail is the most obvious in showing how technology once again becomes the mediator in translating and associating interests. Just like cars, MRT as an artifact also speaks for itself, bringing once again the image of renewed modernity and making obsolete the existing old system. Monorail has the same characteristics of offering speed and sophistication. They promise an orderly, civilized fashion of mobility as opposed to the current erratic and chaotic way that Jakarta streets operate. Foreign interests piggy back on this, or more precisely, they translate their own interests on channeling more loans and marketing their products on this technology. Meanwhile, local actors are divided between joining this association based on political interests or quick business profits.

This can be seen on the controversies that have occurred along the way.

Initially, the development of MRT came to a halt because of the Asian financial crisis in 1997. Not long after, under then President Habibie, the plan was revived with the argument that this large infrastructure project could help generate employment, thus helping the country bounce back from the crisis. However, it appeared that this project would not only serve that kind of interest. There were other interests coming from local businesses, especially those close to the authority, piggy backing on this planned development. Thus, a different set of association is formed along with Japanese interest on financing the project through a loan. This new association, however, faces opposition from the World Bank and local NGOs. The delay of the project due to this reason shows that there is not a strong enough translation of interests to be able to enroll the opposing actors.

During the halt of MRT plan, came a set of different actors proposing for the development of monorail in 2003. This association of mainly business interests of Malaysian consultant and local companies translated once again their interest to align with that of the Indonesian government and the Jakarta authority: creating a more modern city with a technological innovation of elevated light rail trains. In its relatively short planning period, those involved in the project employ a Trojan-like strategy by immediately executing construction of foundation poles before being able to secure financial resources to complete the whole system. Columns for monorail were already erected along its supposed routes when even the technology for operation remained undecided as the focal actor, PT Jakarta Monorail continuously try to build stronger allies with different parties. Until today, those poles remain unfinished as there are no certainties of funding sources and the future of the project remains unclear.

All the while, the push for better mobility and the already saturated car-based transport network serve as the argument of why then Jakarta Governor Sutiyoso hastily carried out another project: the BRT. Solving Jakarta's transportation woes has been high on his agenda since he first took office in 1997. While plan for MRT is shelved and monorail development came to a halt, Sutiyoso embraced another opportunity by promoting BRT.

This time, the offered technological solution was deemed to be the most appropriate and was met with little opposition among the focal actors in urban transport network. There were resistance from existing public bus operators, but they were quickly enrolled into the association through the TransJakarta consortium. Thus, the project took place quite smoothly and 10 BRT corridors were already added to Jakarta's urban transport network as of today, although its operation is far from perfect.

Following the failure of monorail and the construction of BRT, the MRT plan was revived again in 2005, when under a different regime (President Susilo Bambang Yudhoyono and Vice President Jusuf Kalla) a different alignment of interests was formed. The option to go on with the project itself was never questioned, nor was the notion that Jakarta needs MRT. Those issues are already black-boxed. What changes is the formation of foreign and local businesses that are going to be involved in the project. Details of the MRT plan also slightly changes, responding to more recent development. The MRT routes now include the abandoned route initially designated for monorail.

The way one transport mode relates to another in Jakarta shows that the different layers of technology that have been introduced and have shaped the city's urban transport network creates a system of connection that no one intended, no one has interests in except for the informal transport workers. Traces of the old technologies still exist. One can easily notice how *becak*s that now mostly operate in suburban areas cater to the need for door-to-door service of passengers stepping off from a micro bus. Or the way a potential TransJakarta passenger travels the distance between his house inside an alley to the nearest busway station on a *bajaj*. Or in reverse, how one steps off the TransJakarta and hails a motorcycle taxi to reach his destination.

It seems that in Jakarta, every time a new technology is introduced, it quickly become a mediator in translating, changing and associating interests. Obsolete ones are thrown away to the sea like in the case of *becak*s. It is perhaps the fixation on modernity, on realizing the dream to turn Jakarta into the country's showcase to the world that triggers this. Perhaps, as Rimbaud said, it is absolutely necessary to be modern, whatever modern means for the actors involved in the shaping of urban transport network in Jakarta.

For the last four decades, urban transport development in Jakarta has paid too much attention and wasted too many resources on technology-based projects. Even studies funded by foreign institutions tend to go to this direction. There has not been enough effort to improve the system, non-technologically speaking. Like an advanced procrastinator, the government and city administration also avoid dealing with this.

Many have started to voice a 'fix it first' spending priority for transportation planning and development, suggesting cities to 'give top priority to maintenance, operations and incremental improvements to existing transportation facilities' (GTZ, 2b, 2003: 12), meanwhile, Jakarta administration still insists on prestigious projects.

Another criticism is on the closed nature of the process of transport planning that allows little space for public scrutiny when in fact its development is for the public and uses public resources. This seems to be a general phenomenon of transport planning, not only in Jakarta. Vasconcellos (2001) points out that:

> *"One important tool for the success of such a closed decision-making circuit is the use of many cost-benefit studies after decisions have been made and political commitments to proceed with the project already, leaving little – if any – space for alternative proposals."* (Vasconcellos, 2001: 105)

The last point to be made concerns the issue of technology transfer. Several critics have argued that transfer of foreign technology:

> *"…are culturally biased against paratransit; foreign lenders are seeking to export modern transport technologies to developing regions, a form of technological imperialism; and in the drive toward modernization, particularly in image-conscious national capitals, paratransit is viewed as an inferior, obsolete mode."* (Cervero and Golub, 2007: 450)

And despite the proven efficiency of MRT, monorail and other technologies taken from developed countries, there is the threat that:

> *"[The] Substitution of rapid transit systems, buses and taxis for jitneys, mini-taxis and pedicabs will result in an increasing dependence on foreign technology, foreign capital and foreign skills - a*

phenomenon that has been described as the 'imperialism of urban public transport." (Rimmer, 1984: 49)

It is not a way of saying that technology is bad and that developing countries should be xenophobic or allergic to it. It is wise to learn from the failure of absorbing production know-how in the country's automotive and electronic industry. There is a compromise if technology transfer is indeed needed, that is by involving as much local resources as possible, including human resources to be trained about the technology not only as operators and assemblers, but also as maintainers and producers in the future. This has been somehow proven by the introduction of the BRT, in which local companies can gradually produce the articulated buses that were needed. If one were to be more ambitious, China's case of developing its own MRT could serve as an inspiration.

5.4. Analysis on informality

As have been described in the previously, despite having legal credentials, currently public transport in Jakarta operates in a very informal manner. Its very fragmented yet somehow structured operation, involving thousands of actors and conflicting interests makes integration process difficult. From previous analysis, it is obvious that this issue is neglected or at least has not been prioritized as actors and interests involved in it are those who are not politically focal.

With the newly introduced technologies of BRT, MRT and monorail, it seems inevitable that the slowly marginalized paratransit must, one way or another, adapt itself. Seeking adaptation and integration strategies would be impossible without understanding the nature of informality in general. Several theories and studies on informality, both as an economic subject and more specifically on urban transport, could help point out space for improvement and further strategy generation.

The study of informality as an economic and urban development subject has evolved since first assumptions of the issue were made in the 1950s. At first it has been viewed as a transitional phase that a country has to go through before entering a modern economy. But, as it grows, especially in urban areas as a feature of modern capitalist development,

many have argued on such definition. As the term first coined in 1972 as a result of investigation on employment in Kenya, informality is getting more and more acceptance as a permanent phenomenon, although some still argues that as a country reach a certain level of economic growth, the sector will disappear.

While the subject is still under discussion, the tendency has been to break down the division between formal and informal economy. Lipton (1984) in Guha-Khasnobis, Kanbur and Ostrom (2006) argues that instead of a clear split, there exists a continuum between formal and informal. He also points out that researches and studies tend to neglect scrutinizing the relationship between the informal sector and the economy as a whole. Roy (2005) also argues against the dichotomy of the formal and informal, it is suggested that the two are 'series of transactions' interconnected with each other.

Responding to this, several references on the issue are gathered to help provide general characteristics of the informal and how it relates to the economy in general.

Key features of informality in general

Old and new view of the informal economy

The old view	*The new view*
The informal sector is the traditional economy that will wither away and die with modern, industrial growth.	The informal economy is 'here to stay' and expanding with modern, industrial growth.
It is only marginally productive.	It is a major provider of employment, goods and services for lower-income groups. It contributes a significant share of GDP.
It exists separately from the formal economy.	It is linked to the formal economy—it produces for, trades with, distributes for and provides services to the formal economy.
It represents a reserve pool of surplus labour.	Much of the recent rise in informal employment is due to the decline in formal employment or to the informalisation of previously formal employment relationships.
It is comprised mostly of street traders and very small-scale producers.	It is made up of a wide range of informal occupations—both 'resilient old forms' such as casual day labour in construction and agriculture as well as 'emerging new ones' such as temporary and part-time jobs plus homework for high tech industries.
Most of those in the sector are entrepreneurs who run illegal and unregistered enterprises in order to avoid regulation and taxation.	It is made up of non-standard wage workers as well as entrepreneurs and self-employed persons producing legal goods and services, albeit through irregular or unregulated means. Most entrepreneurs and the self-employed are amenable to, and would welcome, efforts to reduce barriers to registration and related transaction costs and to increase benefits from regulation; and most informal wage workers would welcome more stable jobs and workers' rights.
Work in the informal economy is comprised mostly of survival activities and thus is not a subject for economic policy.	Informal enterprises include not only survival activities but also stable enterprises and dynamic growing businesses, and informal employment includes not only self-employment but also wage employment. All forms of informal employment are affected by most (if not all) economic policies.

Source: Chen (2007)

From the above chart, we could point out several key features of the informal economy:

- significance and permanence
- continuum of economic relations
- segmentation, which could be classified as below:
    - self employment in informal enterprises including employers, own account operators and unpaid family workers
    - wage employment in informal jobs such as casual or day laborers, unregistered and part-time workers (Chen, 2007)

Chen (2007) also summarizes the three different takes on informal economy:

1. Dualist view which argues that informal activities have very little link to the formal economy and operate as a separate entity.
2. Structuralist view which argues that informal economy is an intrinsic part of the formal one, forming a relation where the informal serves as a subordinate to formal capitalism.
3. Legalist view which focuses on the relationship between informal entities and existing formal regulations

There is also additional view from Todaro and Smith (2006) which elaborates more on the geographical factor that:

"In terms of its relationship with other sectors, the informal sector is linked with the rural sector in that it allows excess labor to escape from extreme rural poverty and underemployment, although under living and working conditions and for incomes that are often not much better. It is closely connected with the formal urban sector which depends on the informal sector for cheap inputs and wage goods for its workers, and the informal sector in turn depends on the growth of the formal sector for a good portion of its income and clientele." (Todaro and Smith, 2006: 330)

From all the different perspective of informal economy, most would agree on several points as rationale for supporting the sector:

1. Resilience even under a hostile policy environment (Todaro and Smith, 2006, Chen 2007)
2. Minimum capital requirement (Sethuraman, 1996)
3. Takes up semiskilled and unskilled labor, and thus becoming;

4. Provider of low-cost training and apprenticeship (Todaro and Smith, 2006)
5. More likely to adopt appropriate technologies and make use of local resources, allowing for more efficient allocation of resources (Todaro and Smith, 2006: 332)

Although all the first four rationale are also traits of strength seen in the informal public transport operation, the last one could be highlighted as one most suitable in pointing out one of the strategy for rationalization.

General characteristics of informality in public transport

Specifically for urban transport sector, informality usually occurs in cases where government is taking the back seat in the provision of public transport. Although the degree to which this laissez-faire approach varies, the result is mostly common: a fragmented, horizontally structured independent operators. (Cervero, 2000) The informal public transport operates in the manner of:

"…a loose, horizontal fashion, dependent upon carefully cultivated linkages and nurtured relationships among stakeholders, including fellow operators, parts suppliers, mechanics, local police, creditors, and street hustlers, among others. Thus, rather than relying upon intra-firm relationships and collaborations for the production of services, the informal transport sector depends upon inter-personal and inter-operator linkages and fellowship". (Cervero and Golub, 2007:449)

Cervero (2000) elaborates on the key traits of informal transport as follows:

1. Entrepreneurialism, be it individual, family business, cooperatives or route associations
2. Small, aging vehicles domination
3. Low-performance services as a result of stop-and-go movement of aging vehicles
4. Gap-fillers taking competitive niche markets and complementing as feeder services

Several benefits to be pointed out from informal public transport are:

1. Despite its notorious image, informal transport has actually provided the much-needed mobility for those who can not or, although rare, refuse to own their own private vehicle.

2. This type of public transport also has a great maneuverability due to their small size and offer of door-to-door service. It has also been a source of employment in many developing cities.
3. Similar to the traits of informality in other service sector, it is flexible in responding to the market.

Aside from those benefits, most forms of informal transport usually cause these concerns:

1. Indiscipline manner of operation in the streets such as reckless driving, congesting crossroads while loading for passengers
2. Cut-throat competition and the war for the penny
3. Air pollution due to under-maintained vehicles

In most cases, the notoriety of informal public transport outweighs its benefits in the eye of government officials, and thus operators in the sector are 'often politically weak, poorly represented in the formal city democracy, and are more closely associated with traditional, as opposed to modern, society' (Cervero, 2000) or in some cases having false representatives that act no more than rent-seekers.

Informal public transport, in its various forms, has mostly been either left on their own, marginalized or banned altogether.

Jakarta administration, for example, stopped issuing license for becaks in 1972 (Cervero, 1992), ban them in 1990, revoke the ban in 1998 and reenacted it 2000. The ban was conducted in an 'iron hand' way, offering no alternatives for owners and drivers for source of livelihood. It has even been 'inaugurated' by sinking becaks in Jakarta bay. In the 1980s, the administration introduces replacement for becaks in the form of three-wheeled bajajs. According to the plan then, the 150,000 becaks were going to be replaced by 10,000 bajajs Later on, it has also restricted since 1995 the operation zone for three-wheelers bajaj to the city's periphery.

A better approach to informal transport took place during the introduction of BRT Transmilenio in Bogota. Existing bus operators who operate in a semi-formal way are integrated. However, Perez-Castro (2008) pointed out in her study of this process of

‘modernization’ that in fact just a few traditional actors are integrated to the system. The few bus owners that participated in Transmilenio at the beginning entered as shareholders, by handing over their buses. The rest of the companies and bus owners that are not participating in Transmilenio are willing to but lack the financial capacity. It was then suggested that these financially weaker actors are either organized into a cooperative or join larger companies which will participate in the next bidding of BRT feeder extension in Bogota.

There indeed is a great challenge in rationalizing a public service involving individual private operators. Individual owners and drivers tend to seek to maximize profit, disregarding the transport system as a whole. Reja (2002) argue that since those actors operate under ‘a poorly defined property rights’, their incentive is incompatible with the demand of public service. Olson (1965) in Reja (2002) has coined the term ‘collective action dilemma’ for this, where there need to be ‘realignment of incentives and compulsions to bring order to the sector’. (Reja, 2002: 4-5)

On policies regarding the informal sector Guha-Khasnobis, Kasbur and Ostrom (2006) point out that the right reach has to take into account:

1. the objectives of intervention
2. the implementation of the intervention
3. the response of the structuring of activities to this intervention

It is highly suggested that intervention of the informal sector focuses on empowerment of individuals to ‘self-organize and address their collective action problems by themselves’. (Guha-Khasnobis, Kasbur and Ostrom, 2006: 7)

It is also advised that whenever possible intervention should be placed at the appropriate level where actors are influenced, at the national level if it involve a national market or a local level if it involve local groups. Focus should also be placed on implementation and absorptive capacity of the actors, taking into account that the intervention seeks not to replace informality with formality, but instead improving its performance quality. (Guha-Khasnobis, Kasbur and Ostrom, 2006)

6. CONCLUSION

From both literature and field study, it is quite apparent how urban transport planning in Jakarta has been largely directed by national interests as a consequence of the city being administrative and political capital, as well as prominent place for foreign investment. It has also been intended as Indonesia's showcase of modernity, at least visually. Due to this predominant interest of making the city modern, in the case of urban transport, studies have largely focused on offering 'modern' technologies, from automobile to mass rapid transit options that requires heavy investment. Most of these studies are funded by international development organizations and in most cases embedded with promised funding resources and imported technical assistance – including foreign consultants and transport technology providers -- in putting it at work.

The World Bank has been long a supporter for road-based transport and privatization of infrastructure provision, while the Japan International Cooperation Agency focuses on rail-based mass transit. Unfortunately, these studies rarely place offered solution in a social and political context and often ended up stuck with those issues on the ground.

Year by year, on paper, new technologies replaced older ones while the government itself is left undecided as the city never quite has a transport network master plan, even until today. It is quick at scraping technologies deemed obsolete like the dismantling of inherited tram lines from the colonial era and the marginalization of human-pedaled passenger transport *becaks*.

Just when Jakarta administration stated its readiness for starting the construction of mass rapid transit, came the 1997 Asian economic crisis that puts the plan back on the shelf. All the while, the city has grown into a sprawling metropolis relying on private vehicle and a rich but disintegrated mix of public transport modes that mostly operate in an informal manner. Regulations and policies that have been put in place regulate only a minor part of public transport system, but touch neither at minimizing its weaknesses nor supporting its strength.

It is also apparent that both the national government and Jakarta administration have been avoiding dealing with the informality in public transport system as it indeed involves the issue of corruption that worsens the situation and can heavily be politicized as it concerns hundreds of thousands of different actors. Instead, it focuses still on introducing new technologies even until today. And all the while, public transport system in Jakarta has its own take at maximizing the available technology for its own interests. Investment is made as little as possible by employing local assemblies and maintenance costs are kept at a minimum by cannibalizing old fleet. While being left on its own, the informal manner of its operation is slowly getting more and more structured as allies are gathered, directly and indirectly, legally and illegally. The challenge that the city now faces in reshaping its urban transport network requires the administration to, willingly or not, deal with this structured informality and risk taking unpopular but objective decisions.

In the process of shaping Jakarta's urban transport network, technological innovations become key in the forming and reforming of association of interests as is apparent in the case of the development of car-based transport and the way the informal public transport operates. It becomes all the more apparent with the introduction of BRT, MRT and monorail. Every time a new technology is introduced to Jakarta's transport network, interests are changing, old alliances are breaking apart and new ones are forming. Transportation issue is indeed a political one instead of mere technical and after all both is inseparable.

In the case of Jakarta, technicalities remain black-boxed and the process of decision making of urban transport development remains closed, opened only to several focal actors. However, those who are deemed not focal is actually having their own take on things, these are the informal public transport operators and consumers.

After having analyzed the process of how Jakarta's urban transport network comes into being and pointed out actors involved in it, further research is needed on how to synchronize all the existing and the planned modes of transportation in the city. The greatest challenge will remain on how to integrate the highly fragmented informal public transport operators and key to this issue will be what approach would work best.

It is also worthwhile to note that every time something new is introduced to the urban transport network, be it technology, regulations or change of system, there need to be once again the tracing of changing interests, the tracing of the forming and reforming of associations.

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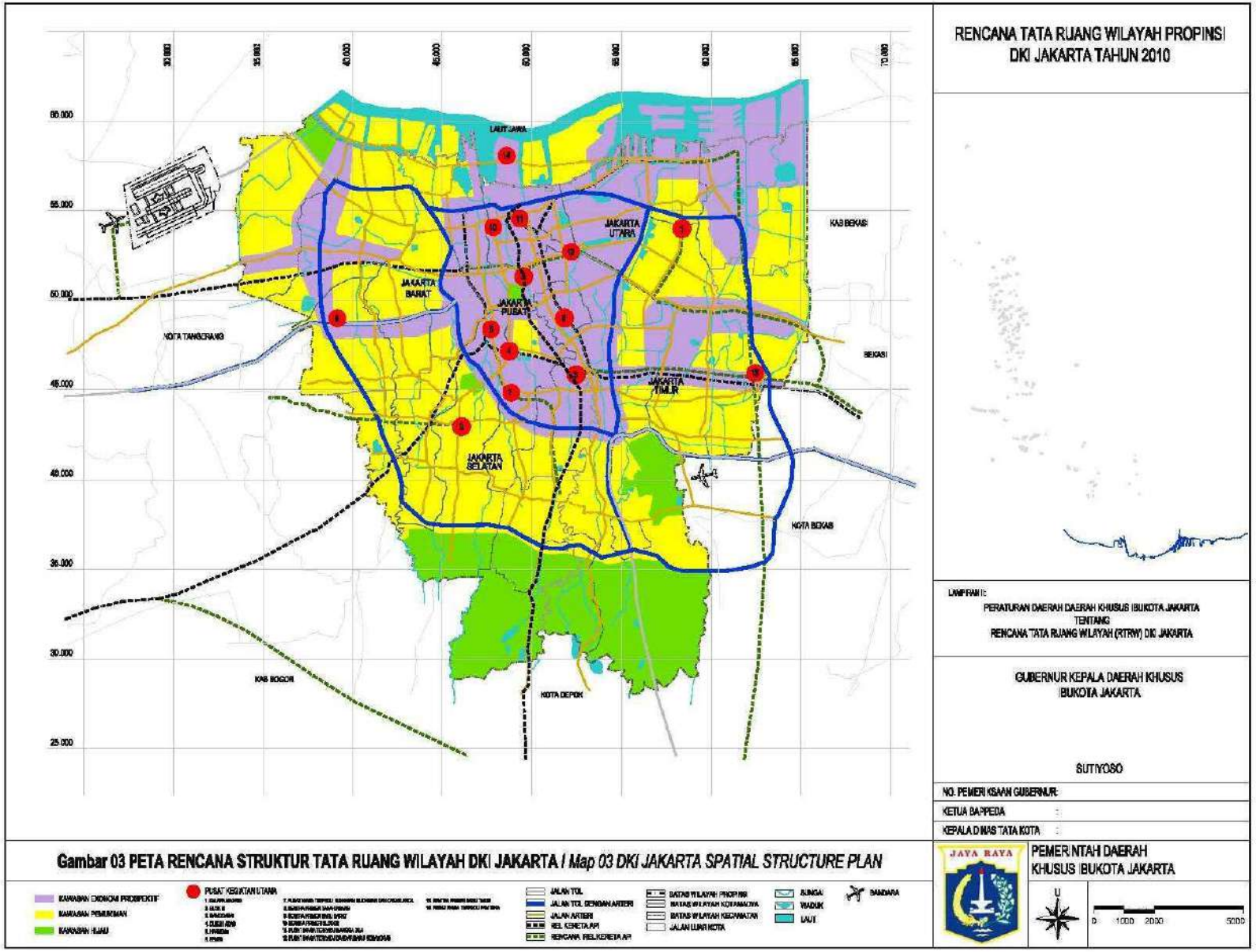
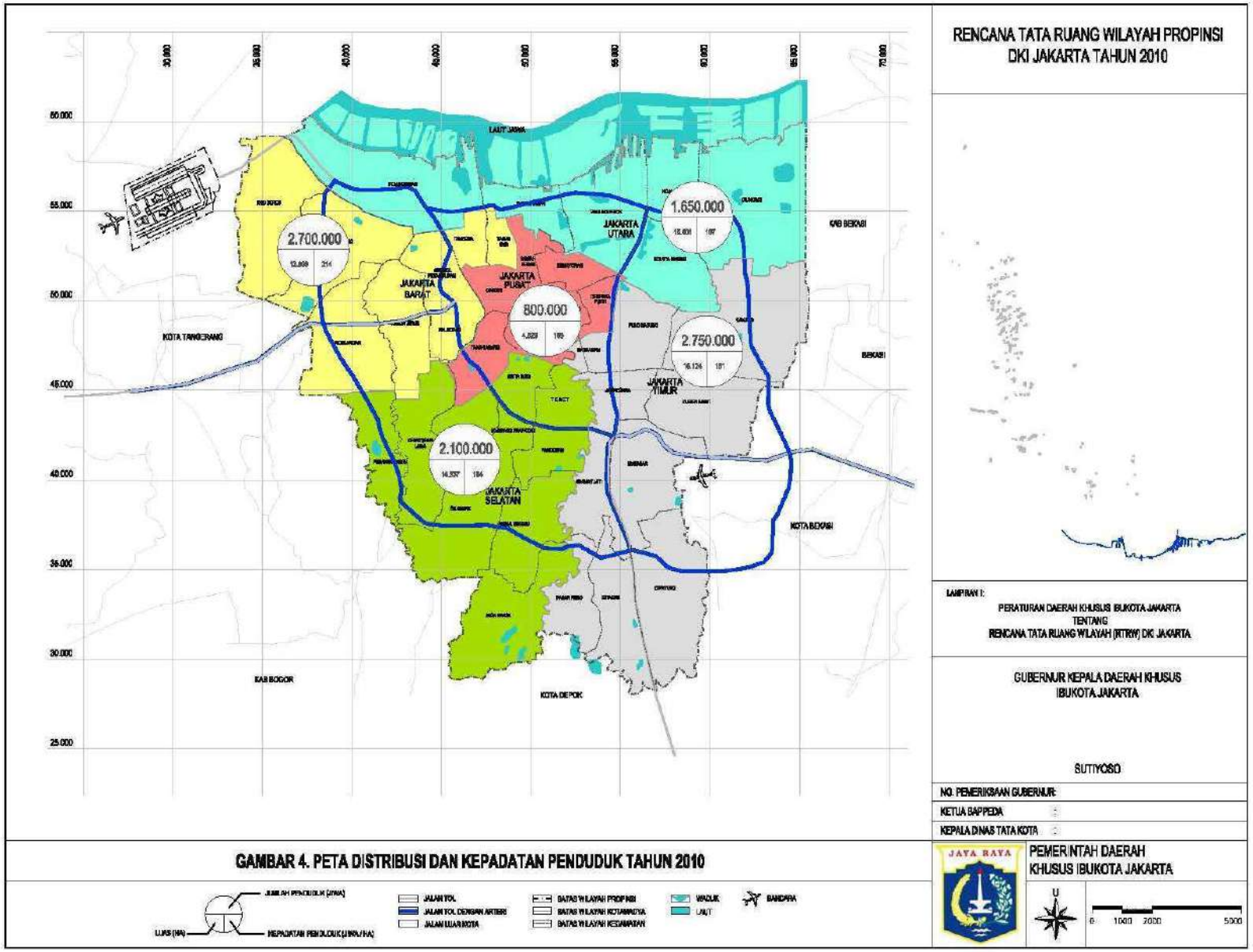
ANNEXES

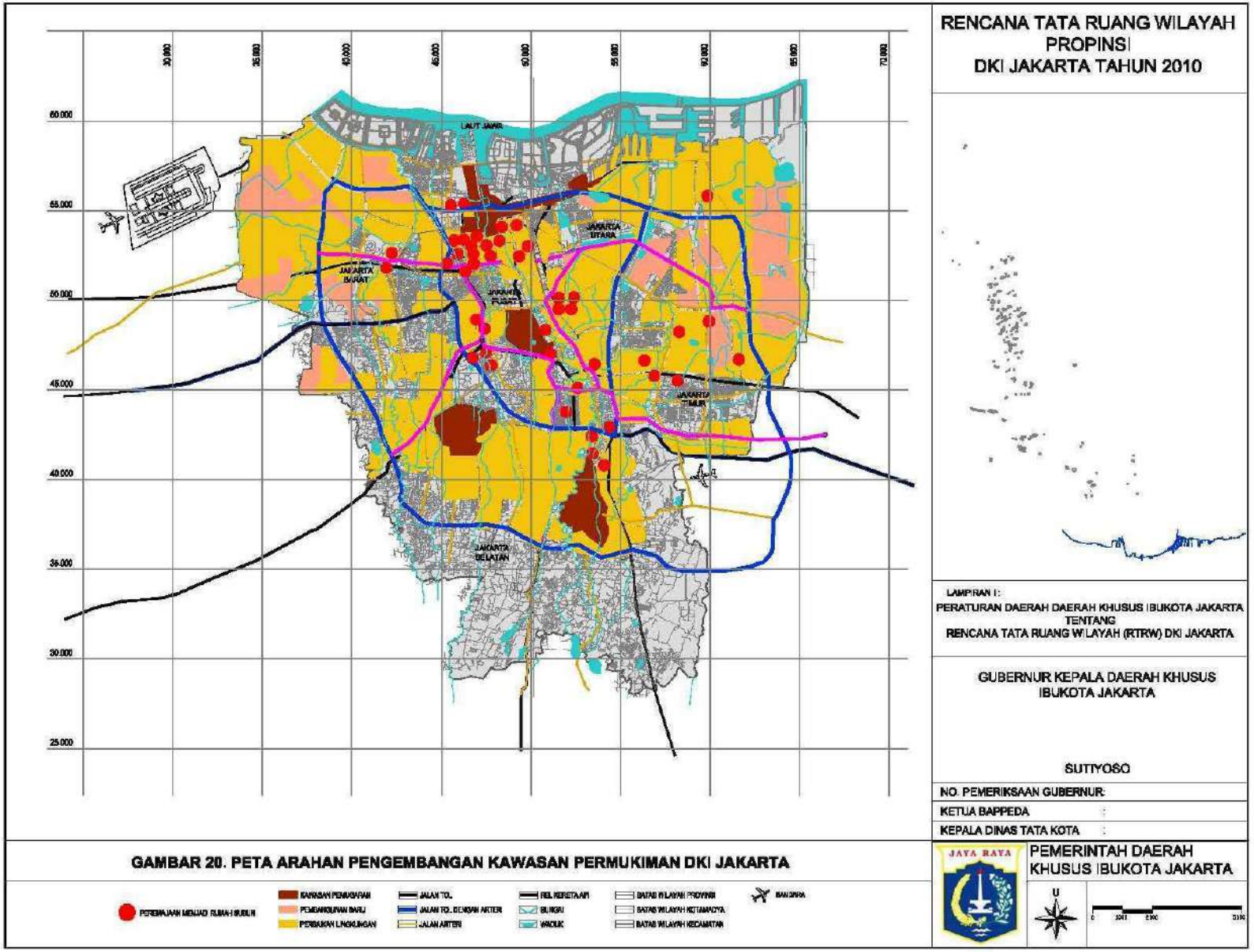
JAKARTA LAND USE PLAN



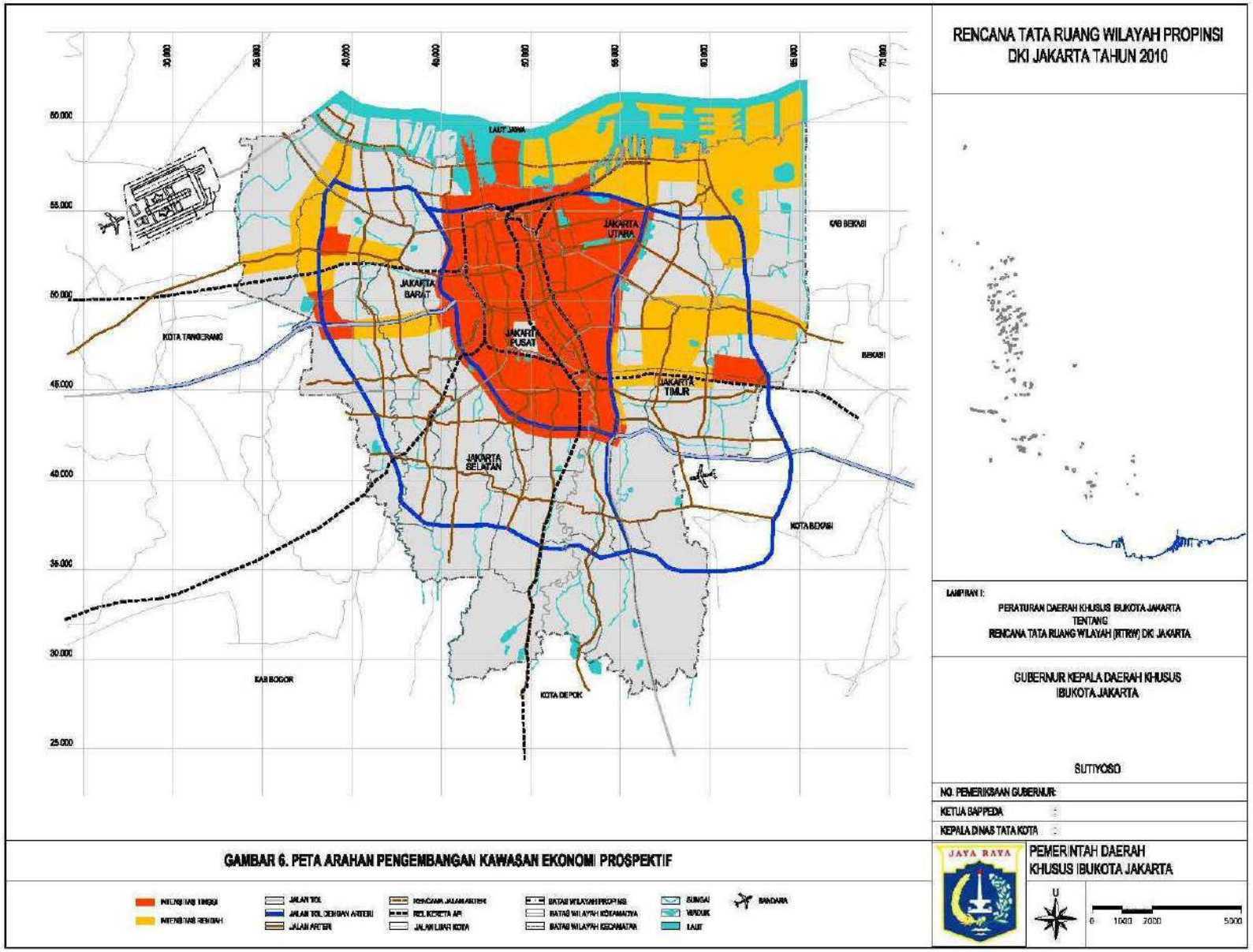
POPULATION DENSITY AND DISTRIBUTION



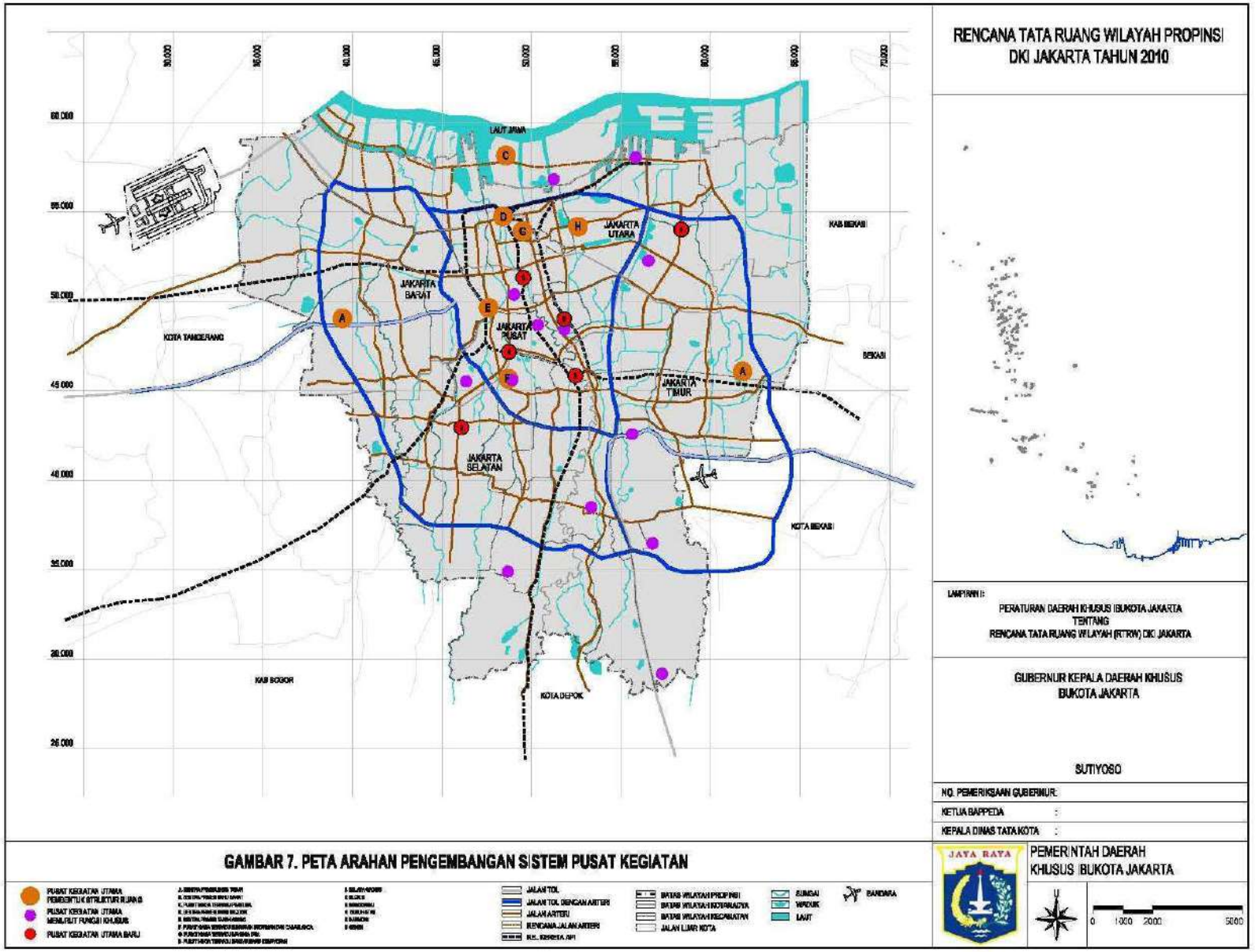
PLANNED RESIDENTIAL AREA



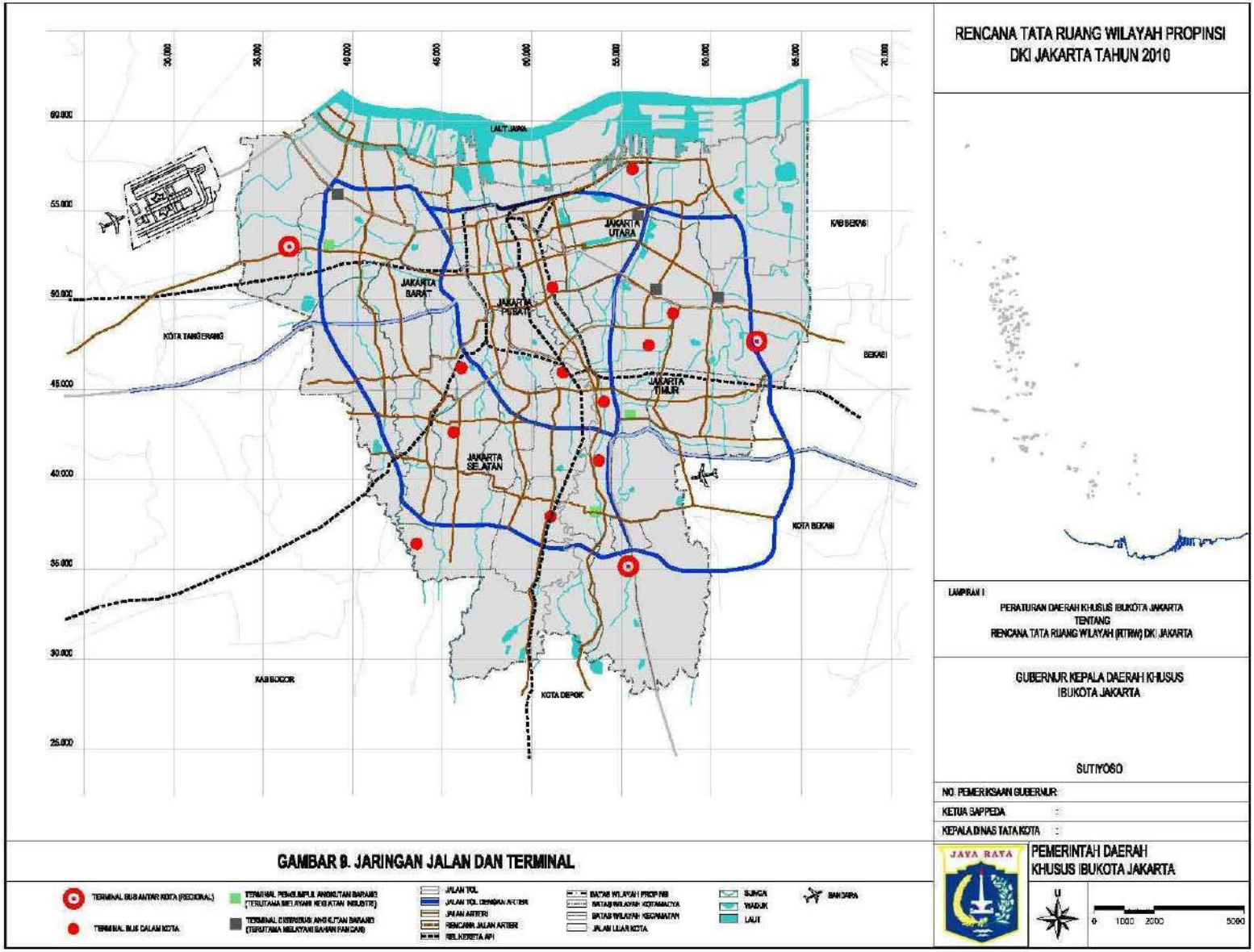
PLANNED ECONOMIC AREA



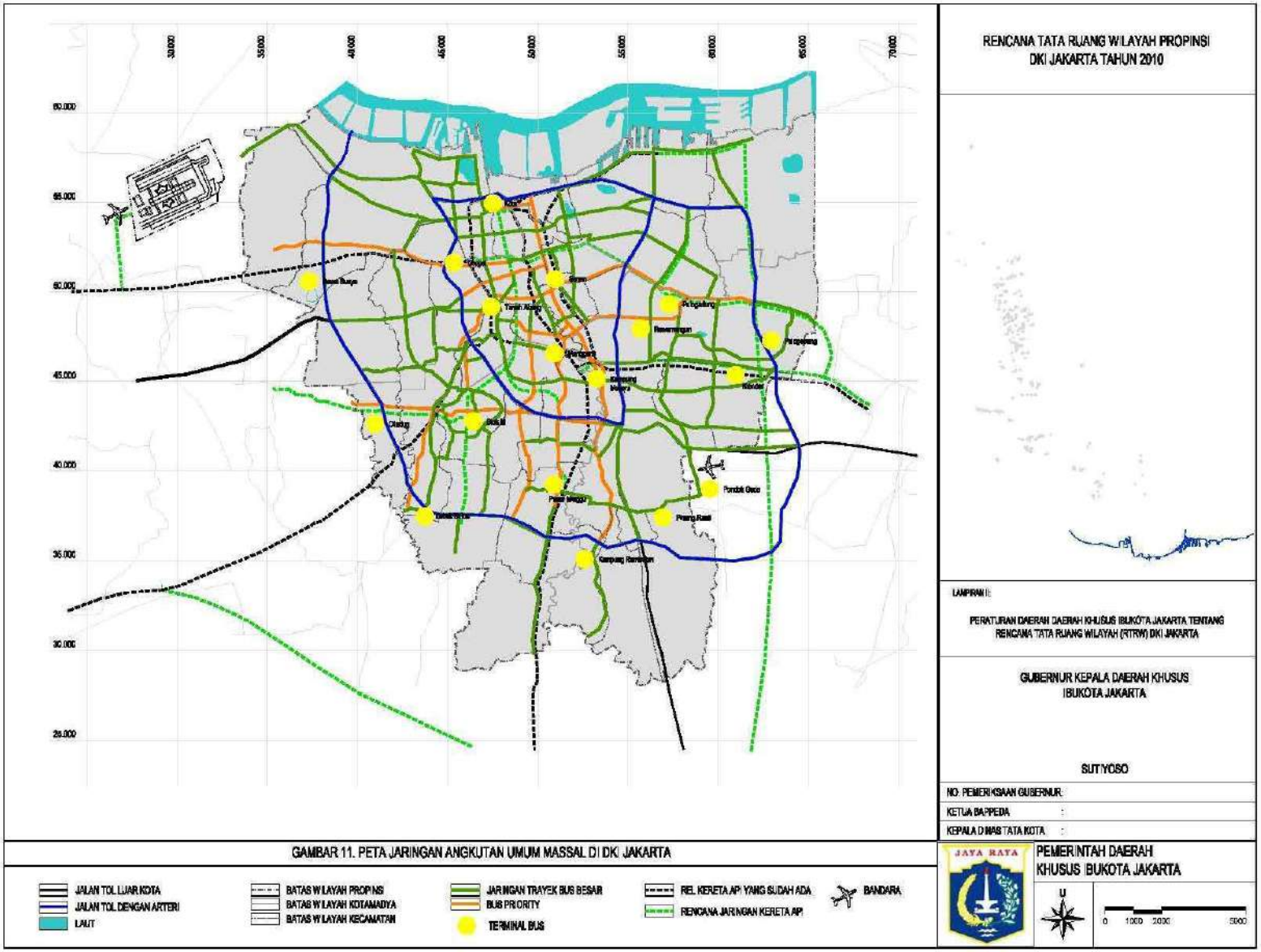
PLANNED ACTIVITY CENTERS



ROAD NETWORK AND STATIONS

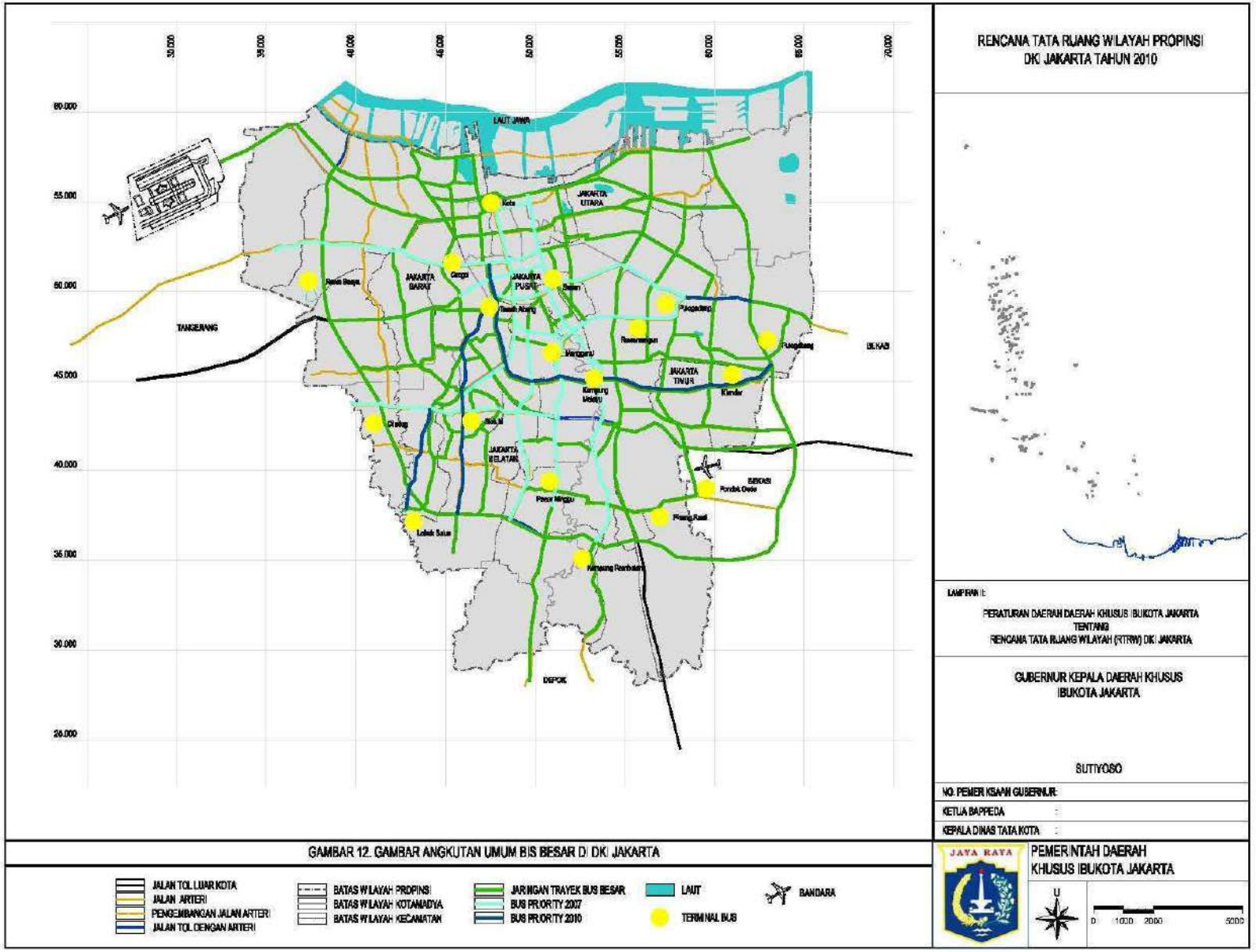


PLANNED MRT NETWORK

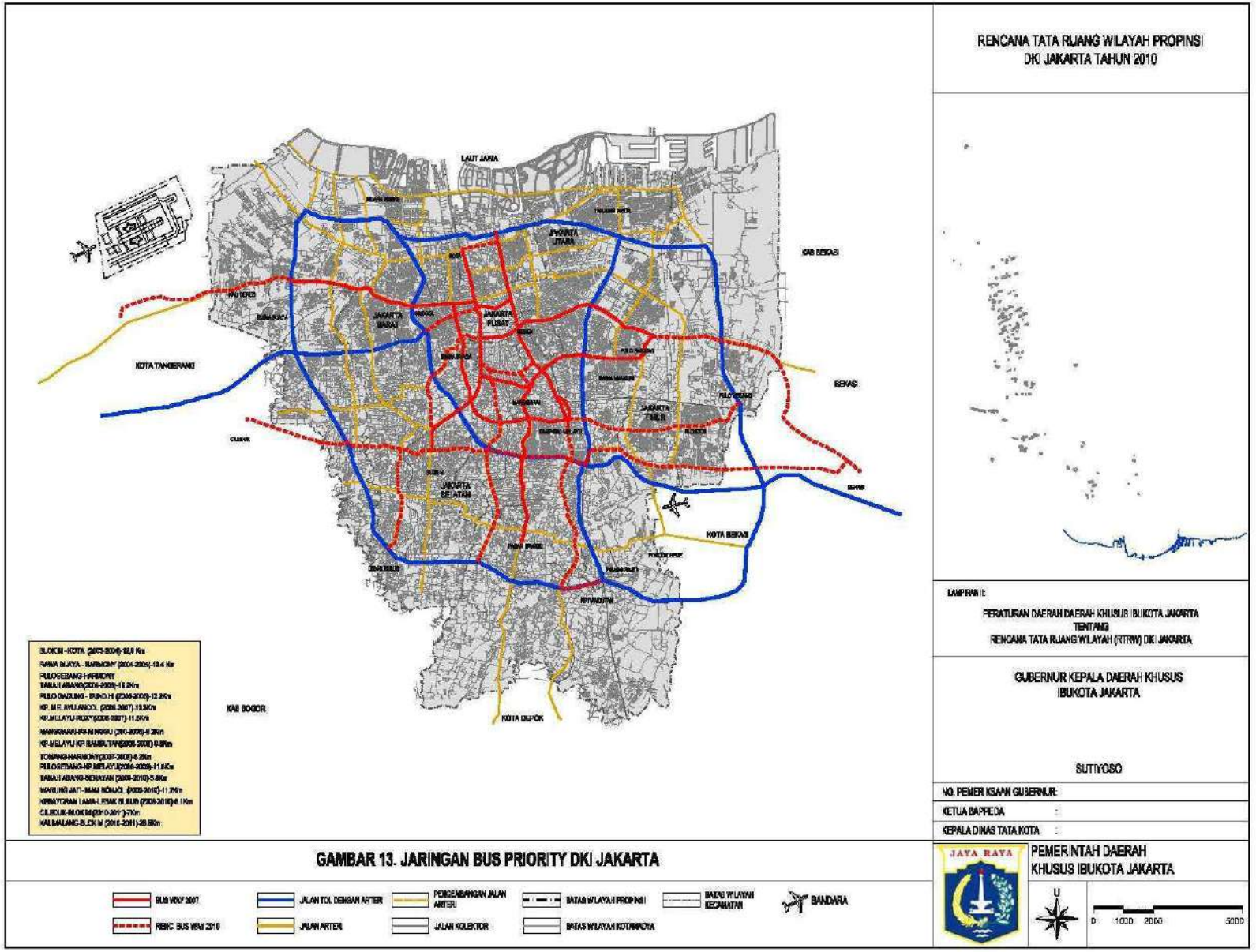


GAMBAR 11. PETA JARINGAN ANGKUTAN UMUM MASSAL DI DKI JAKARTA

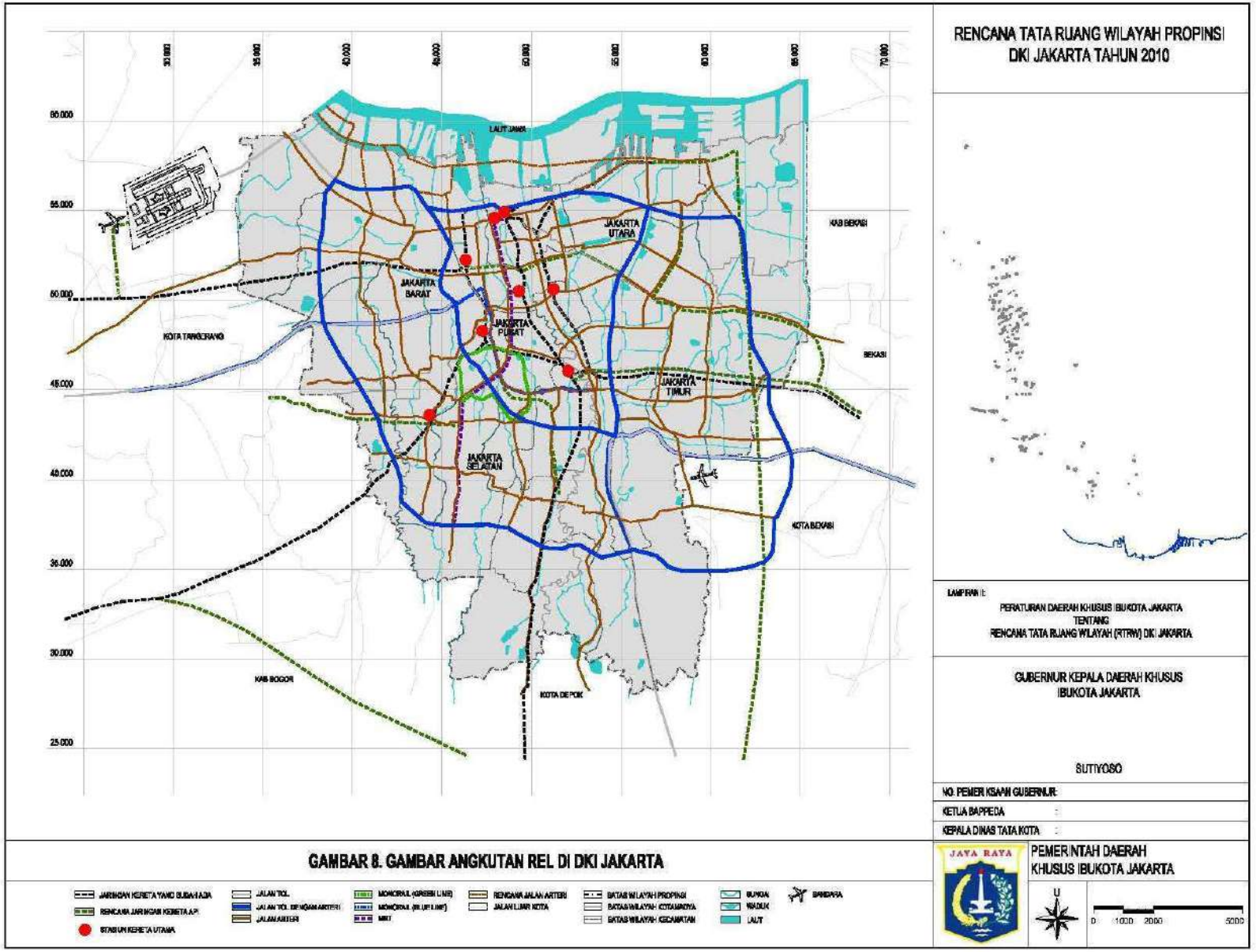
PUBLIC BUS NETWORK



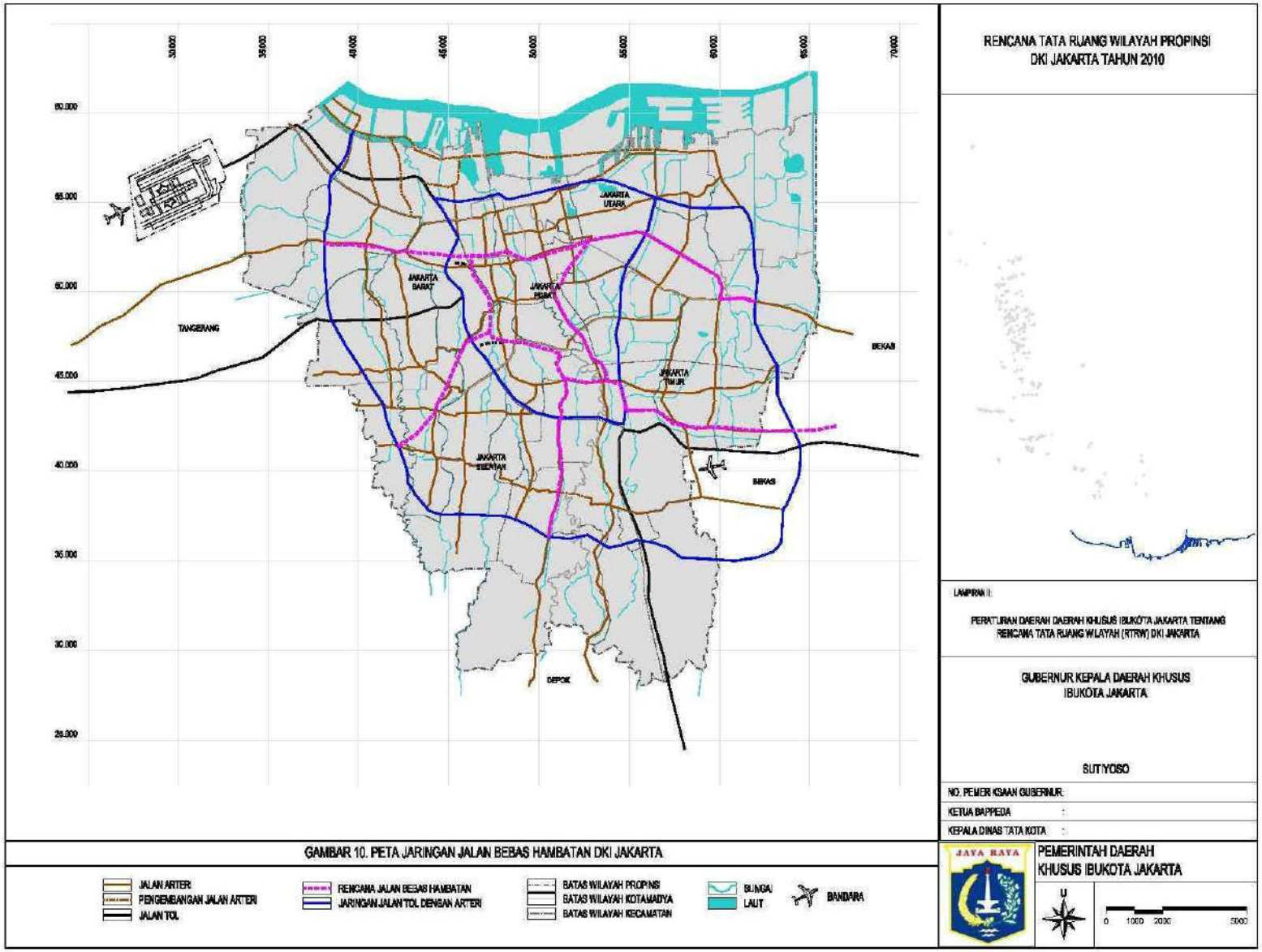
BUS RAPID TRANSIT NETWORK



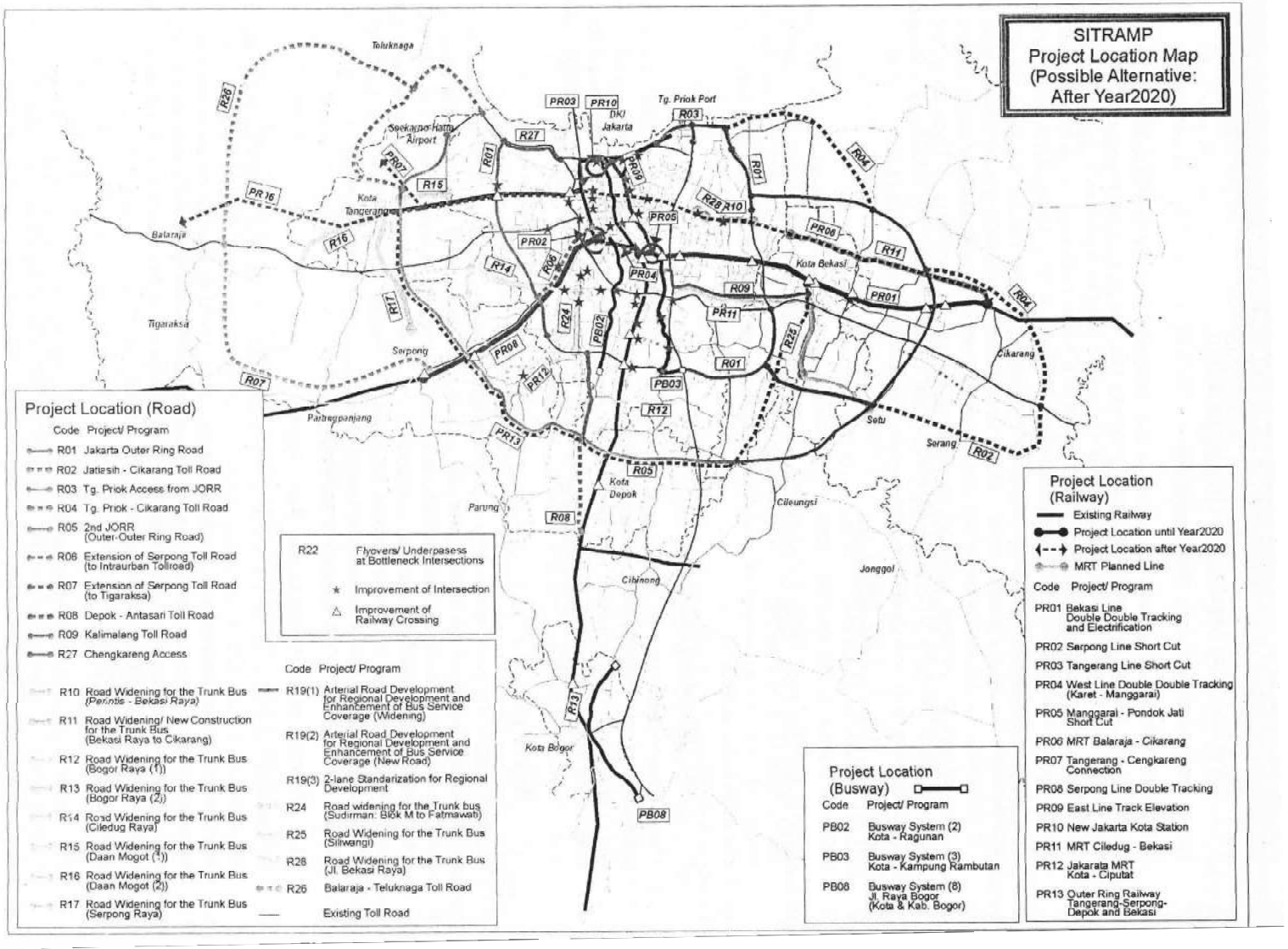
RAIL NETWORK



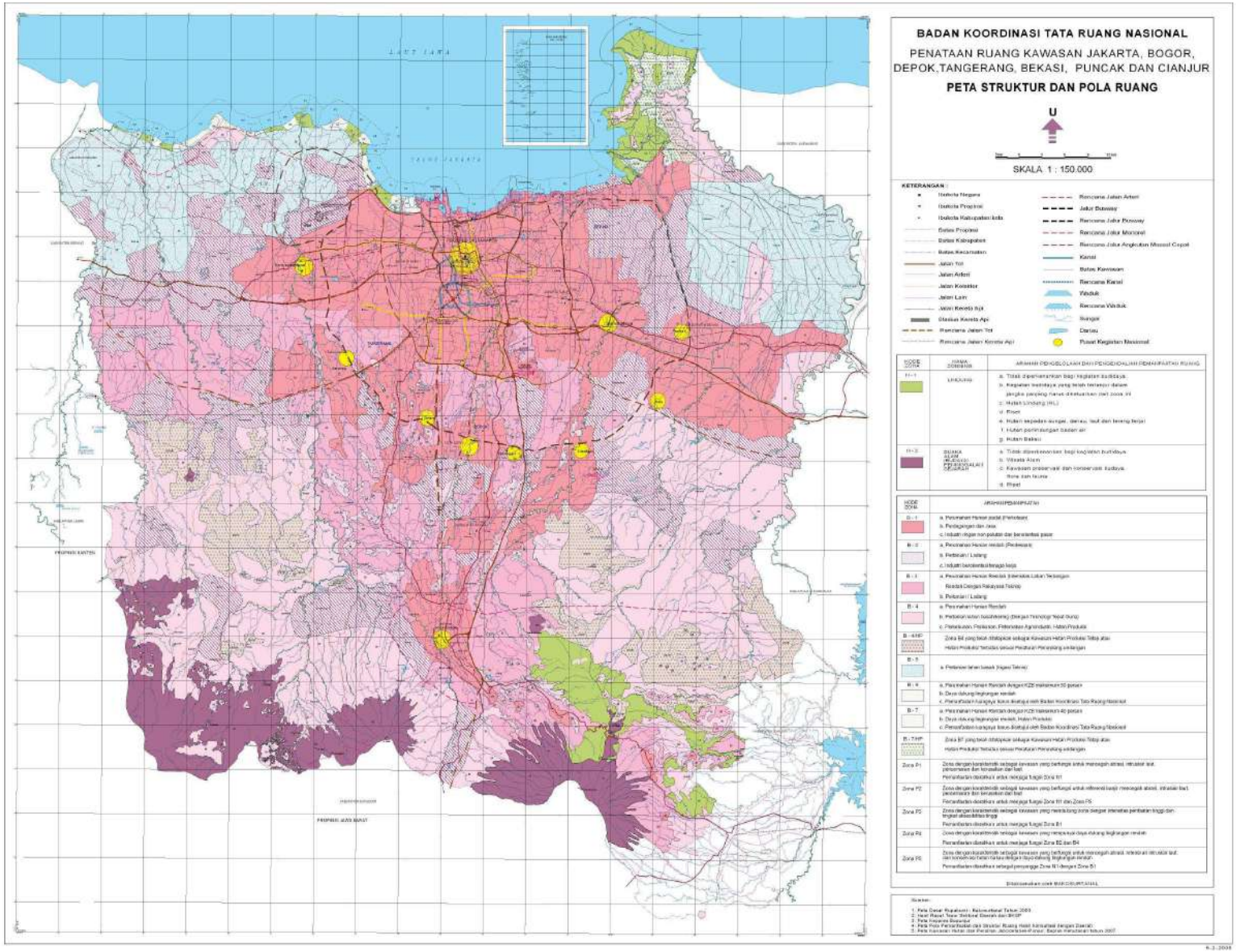
HIGHWAY AND TOLL ROAD NETWORK



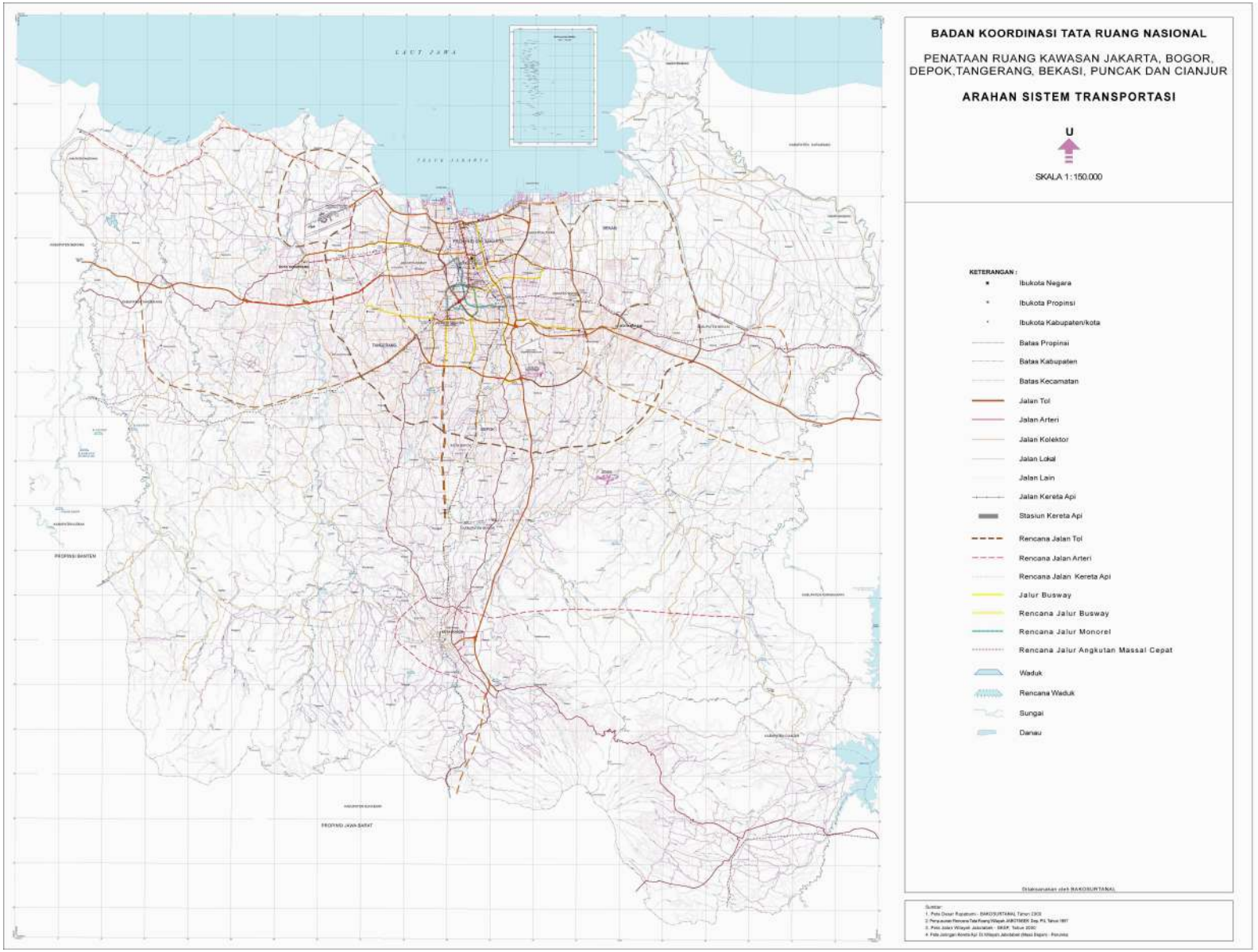
PROPOSED TRANSPORT MASTER PLAN



JABODETABEKPUNJUR SPATIAL PLAN

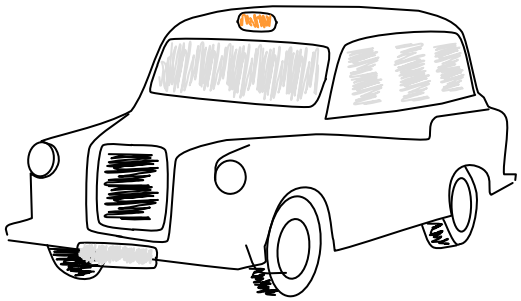


JABODETABEKPUNJUR TRANSPORT NETWORK PLAN



actors

in the shaping of urban transport network in Jakarta, Indonesia



anissa s. febrina

Urban Management Masters' Program. TU Berlin

Berlin . 9 February 2009

what?

motorcyle taxi

bus rapid transit

trains

becak

bajaj

public minivans

private vehicles

public buses

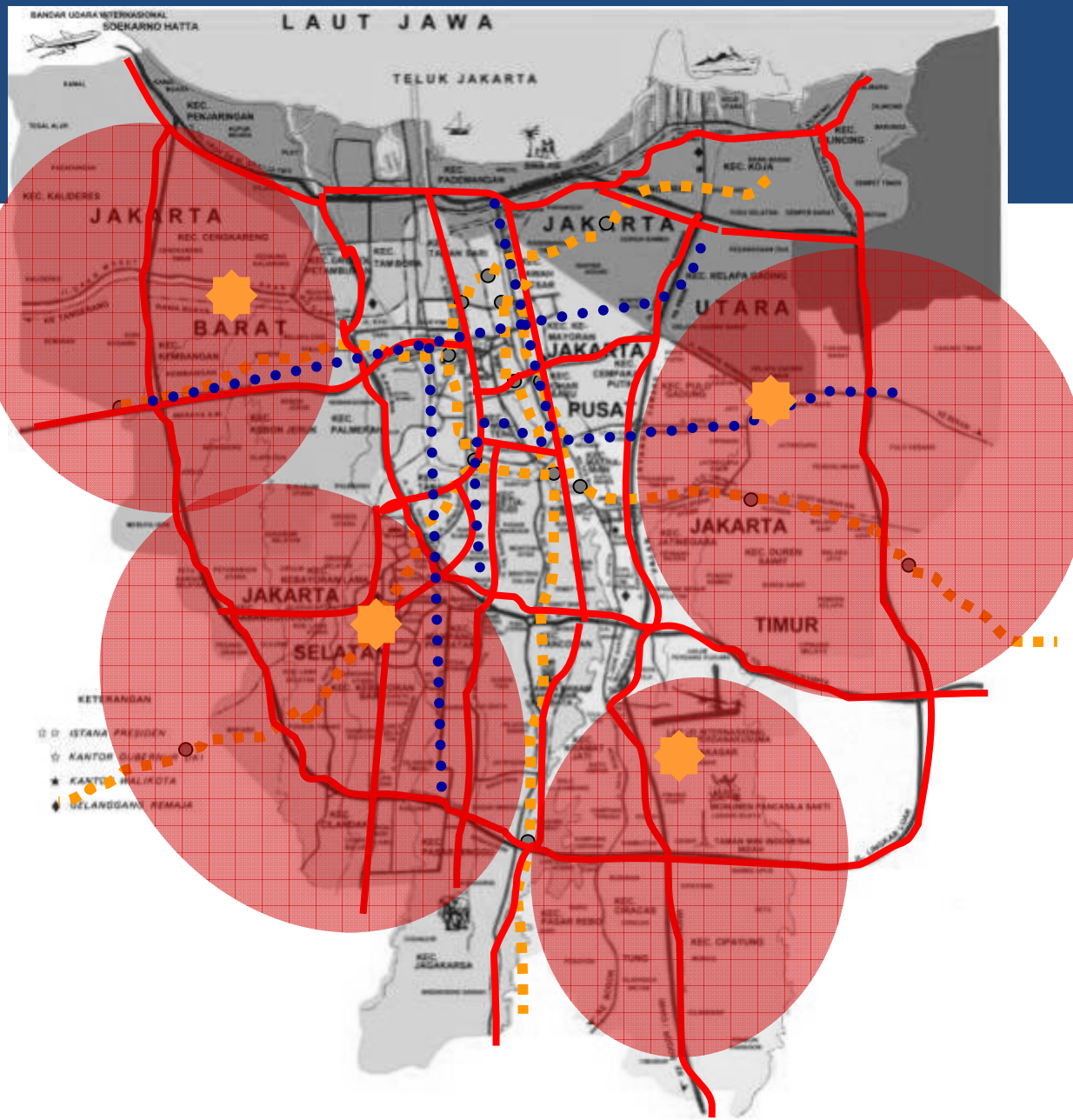
three-wheeled minivans

how has this come into being?

Who and what are the actors in the shaping the urban transport network in Jakarta?

To what extent has technology changed interests of the human actors involved?

How do existing public transport modes and actors who are involved in them interact with each other?



how do we trace the shaping of urban transport network?

actor-network theory, Latour, 2005

Facts (science, technology, artifacts, etc) and actions (from human actors) could not be separated. Technology is not neutral.

Observe science in the making

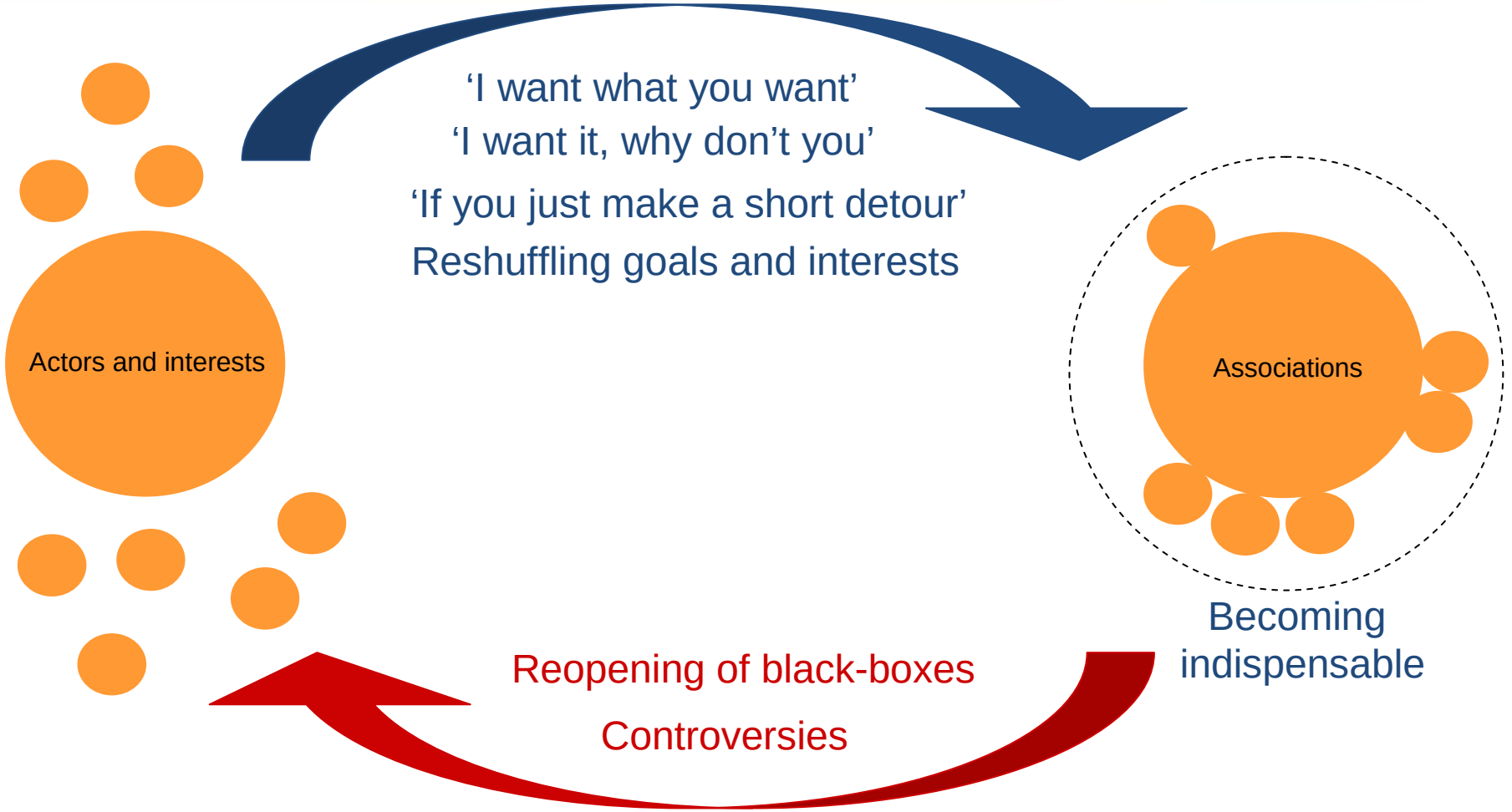
Avoid dichotomy of things

Symmetrically consider human and non-humans

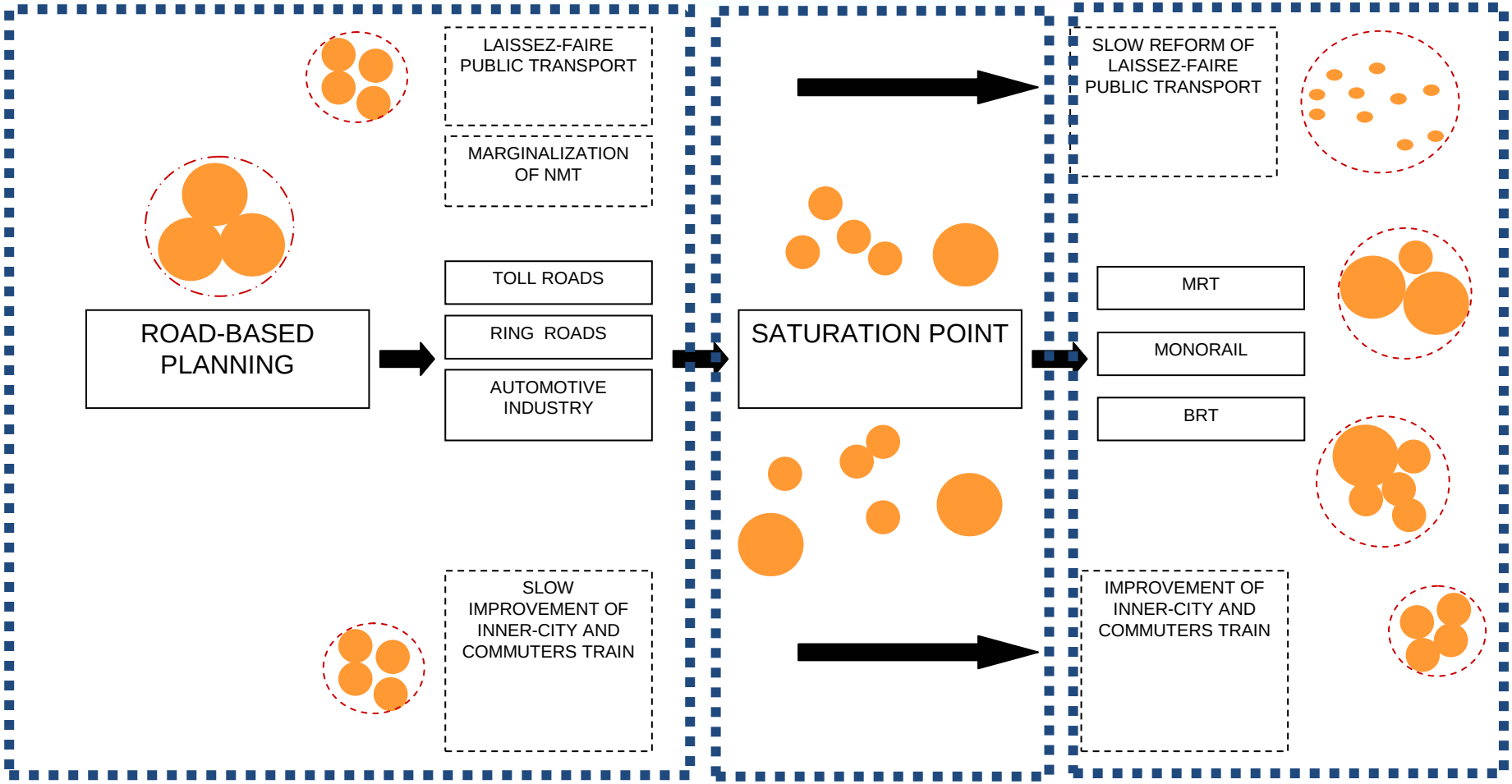
Focus on how a claim transforms in later users' hands

how do we trace the shaping of urban transport network?

actor-network theory, Latour, 2005



how do we trace the shaping of urban transport network?



what does it mean?

Urban transport network in Jakarta is shaped by both focal and marginalized actors, working through formal and informal mechanisms

Each newly-introduced transport technology adds another layer to the urban transport network, dissolves association of actors and serve as a mediator for the forming of new associations

The current urban transport network in Jakarta consists of formal and informal modes of transportations that in a way complements each other from a consumer's point of view, but lacking in efficiency in working as a network

As of today, more emphasis has been placed on capital-intensive projects that benefit mostly focal actors, while systemic change remains unseen

where do we go from here?