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A Comparative Study on Road-based Urban Public Transport Policies in Six Asian Countries from the Viewpoint of Governance, Urban Planning, and Financial Aspects

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Abstract: In this study, we conducted an international comparative study on road-based urban public transport policies in six Asian countries: Cambodia, Indonesia, Japan, Philippines, Thailand and Vietnam. We paid attention especially to governance, urban planning and financial aspects as important background factors for considering road-based urban public transport policies. We found that the assignment of the administration on road-based urban public transport was different in the six countries. Among three urban planning measures, zoning for Transit Oriented Development and land development permission were implemented in all six countries. However, coordination with public transport through these two mechanisms was not necessarily established. In relation to financial policy for public transport, the six countries share many common policies. The exception in terms of the subsidy to paratransit was Japan where paratransit mode serviced in the area with serious population decrease.

Keywords: Comparative Study, Public Transport, Governance, Urban Planning, Financing

1. INTRODUCTION

Urban public transport takes an important role in urban areas in developing and developed countries in Asia and other parts of the world. It satisfies travel demand by the people who

cannot use or who find it difficult in using private modes such as a passenger car or a motorbike. Also, urban public transport is promoted in some urban areas where it is considered as one of the significant measures for solving economic, social and environmental issues in transport sector. However, to develop and maintain urban public transport is not at all simple task in any urban areas of developing and developed countries. In most urban areas, bus mode, a typical example of road-based public transport modes, must often compete with passenger cars and motorbikes on the road whose service level is usually far better, while the upgrading of the public transport mode from bus to subway, light rail or even bus rapid transit incurs huge cost and needs governmental support in most cases.

Therefore, national or local policy toward road-based urban public transport is one of the most important factors for the sustainability of urban public transport. The past literature on urban public transport policy especially from the viewpoint of international perspective is also available. Morichi and Acharya (2012) comprehensively studied transport issues and solutions in Asian Megacities in which the role of public transport was emphasized and the coordination of public transport and spatial planning was considered as necessary. The study also shed light on the institutional and financial aspects of public transport. While some of the objectives of this study are similar with Morichi and Acharya (2012), they did not include detailed international comparison on urban public transport policies among Asian countries from the viewpoint of governance, urban planning and financing. Dimitriou and Gakenheimer (2012) also studied urban transport issues in developing countries from several aspects including coordination between land use and transport planning, and public transport and informal transport issues. The study provided general policy views in relation to public transport in developing countries, however, it did not take much account of different backgrounds against which the government should make urban public transport policies.

In relation to urban public transport from the viewpoint of governance, Mizuoka (2012) introduced regulation theory and discussed neo-liberalism and Fordism (or governmental intervention) and their effects on urban public transport policy. Vasconcellos (2001) also discussed urban public transport policies in developing countries and emphasized equity rather than efficiency issues, which might have parallel with Mizuoka (2012). The regulation theory is useful for considering urban public transport policies especially from the historical point of view, however, this study limits itself to referring to the theory because this study mostly reviews current situation in six Asian countries, and we would like to leave the full use of the theory for further studies.

By using international database for urban transport, Fujiwara and Zhang (2013) studied environmental efficiency of urban transport system in cities of developed and developing countries. Suzuki and Muromachi (2007) and Koizumi et al. (2013) also analyzed urban transport database based on person trip surveys conducted in worldwide urban areas. While the analytical results from these international databases make a basis for generating world standard public transport policies, it is also useful to investigate the current status of urban public transport with its detailed background in order to discuss and generate an appropriate public transport policy in each urban area.

Taking the above past literature into consideration, in this study, we conduct an international comparative study on road-based urban public transport policies in six Asian countries: Cambodia, Indonesia, Japan, Philippines, Thailand and Vietnam. We pay attention especially to governance, urban planning and financial aspects as important background factors for considering road-based urban public transport policies.

Following the introduction in this section, we briefly review the background and the current status of road-based urban public transport in each country in section two. In section three, we discuss governmental system in each country in relation to road-based urban public

transport. In section four, we focus on urban planning aspect, which might be one of the key administrative areas on which the sustainability of urban public transport is depended. In section five, we also review financial aspect in relation to road-based urban public transport in each country. In section six, we summarize our conclusions and further studies.

2. TREND OF ROAD-BASED URBAN PUBLIC TRANSPORT AND PARATRANSIT

In this study, we investigate road-based urban public transport policies in six Asian countries: Cambodia, Indonesia, Japan, Philippines, Thailand and Vietnam. Basic statistics on land area, population and GDP per capita in US dollars are presented in Table 1. While the six countries are all located in eastern side of Asia, the variety of them is not at all small. Hereafter, we briefly review trend of urban public transport and other transport modes in each country.

Table 1. Land area, population, and GDP per capita in six Asian countries

	Cambodia	Indonesia	Japan	Philippines	Thailand	Vietnam
Land Area (000km ²)	181	1919	378	299	513	346
Population	14.3	237.6	128.1	92.3	66.0	86.9
GDP per capita (USD)	783	2947	43151	2136	5102	1302

Source: United Nations (2010)

Currently in Cambodia, road is the most dominant mode of transport due to relatively underdeveloped railway and waterway transport system. In the form of public transport, bus and minibus dominates for long distance, with paratransit particularly motorcycle taxi and moto-remorque dominating in urban areas for short trips. Motorcycle dominates large part of private modes in both rural and urban areas. The number of registered vehicles increased significantly at an annual rate of around 18%, and in 2014 has reached 2.78 million dominated by motorcycles with 2.35 million (accounted about 84%) followed by car with the number close to 429,000. From urban perspective, modal shares in Phnom Penh are as the following. In 2001, private car 10%; private motorcycle 65%; motorcycle taxi 19%; and moto-remorque 6%. In 2011, private car 20%; private motorcycle 64%; motorcycle taxi 8%; and moto-remorque 9%. Bus mode as road-based urban public transport was just introduced in 2014.

In Indonesia, the increasing massive traffic congestion in urban areas generates wasteful fuel energy consumption, and deteriorates sustainability conditions through increasing air pollution, giving threat to public health and slowing down the rate of economic activity in major cities. This condition happened partly because the limited number and lower level of service of urban public transport. In Indonesia, the national government regulation states the types of road-based public transport in permanent and non-permanent route. The permanent route consists of Across country borders Bus (e.g with Malaysia and Timor Leste), Inter-city Inter-province Bus, Inter-city Inside-province Bus, Urban transport (angkot), and Rural transport (angdes). In recent years, rapid development significantly has occurred in the use of the motorcycle. According to the comparison of different mode shares between year 2002 and 2010 in Jakarta, in the year of 2002, the usage of motorcycles only 21%, while in 2010 it increased significantly to 49%. Whereas the usage of buses declined from 38% to 12%. Simultaneously, in the last decade there was a significant increase in private transport modes. The average growth rate for automobiles was 8.9%, for buses 2.3%, for trucks 5% for motorcycles 12.2% and only 8.1% for road-based public transport modes. It is so obvious that

as the population and economic level of Indonesia increase, the use of private vehicles grows higher than that of public transport.

In Japan, over the past 20 years from 1988 to 2008, national total of passenger travel increased by 17% from 1.19 to 1.39 trillion person-kilometers. While the share of passenger car increased by 1% from 57% to 58%, the share of rail decreased by 1% from 30% to 29%, and the share of bus decreased by 3% from 9% to 6%. According to the Nationwide Person Trip Surveys in 1987 and 2010, while the share of passenger car increased from 26.4% to 33.0%, the share of rail increased from 22.3% to 26.0% and the share of bus decreased from 3.3% to 2.7% on weekday in Tokyo, Keihanshin and Chukyo metropolitan areas. In local cities, while the share of passenger car increased from 40.4% to 58.2%, the share of rail increased from 2.5% to 3.9% and the share of bus decreased from 4.5% to 3.1% on weekday. In both metropolitan areas and local cities, on weekend, the share of passenger car was dominant. In three major metropolitan areas where rail network is well-constructed, rail has been competitive with passenger car especially on weekday, but bus has reduced its share until recently. The very recent trend of levelling off in relation to bus might be due to the increase in the number of aged people who might have difficulty in driving a passenger car by themselves. In relation to the trend of paratransit, there is no relevant national statistics. According to Akiyama and Yoshida (2009), the number of demand responsive transport (DRT) mode, one of the major paratransit types in Japan, is increasing in the areas where population decrease is significant and bus mode is not sustainable because of low demand. Because population decrease and aging are on-going in most areas in Japan, the number of paratransit in response to following the change of travel demand is supposed to increase in future.

In 2004, the total inter-regional passenger travel in the Philippines was estimated to be 1.58 billion trips where 98.4% is by road transport. Total inter-regional travel demand in terms of passenger-kilometers of inter-regional was also estimated to be 333,517 million passenger-kilometers where 97.5% of the demand is carried by road transport. The public transport system in metropolitan areas and cities in the Philippines is primarily road-based except for Metro Manila which has a rail-based mass transit system. The jeepney is a major mode of public transportation in the Philippines and is considered a paratransit where it is a transport service between private passenger transport and conventional public transport. Paratransit are comprised mainly of jeepneys and three-wheelers called tricycles. Tricycles are supposed to serve feeder to jeepneys and are not allowed to operate in highways. In Metropolitan Manila, according to a study of the Japan International Cooperation Agency for the National Economic and Development Authority (2014), in the year 2012, the number of person trips increased by 15% by private car while there has been a 7% decrease in person trips used by public transport (public utility jeepney and public utility bus) compared to 1996. However, the number of vehicle trips of private transport increased by 69% and the number of public vehicle trips increased by 41%. The rapid increase in private car traffic can be attributed to increase in private vehicle ownership and decrease in occupancies of cars and similar decline in public transport vehicle occupancies of buses and jeepneys. In Metro Cebu, the second largest metropolitan area, the share of trips using the private modes increased from 9.7% in 1979 to 20.6% in 1992 while the share of trips using public transport decreased from 90.3% in 1979 to 79.4% in 1992. It is anticipated that the Metro Cebu will experience an increase in travel demand due to rapid population growth and urbanization and in 2020, the share of private person trips is expected to rise to 23.5%. For other major cities, the modal share of jeepneys in terms of total vehicle trips in 2003 ranged from 34% in Bacolod City and Cagayan de Oro City and 40% in Iloilo City according to a JICA study on regional growth centers (JICA, 2004). The share of intra-regional person trips using the jeepney ranged from

22 to 36% in regional areas such as Quezon, Palawan and Panay based on O-D surveys conducted in 2006.

In Thailand, according to the modal share between private car and public transport in Bangkok and vicinities, it can be observed at present there are nearly 20 million trips per day, and the proportion of private cars consistently outnumber the public transport counterpart. In Bangkok, the majority of public transport passengers use buses, although the demand for urban rail transport is rising. Such a trend is in line with the increase coverage of urban rail network. The comprehensive urban rail network planning has been studied in Bangkok and neighboring cities. At present, many urban rail lines are under construction. It is expected that the expansion of rail network, a total of 10 lines with a distance over 400 kilometers in the future, could induce more public transport users. In major regional provinces, urban mass transit modes have also been investigated. Such modes include Bus Rapid Transit (BRT) and monorail. However, a decreasing trend of road-based urban transport and paratransit usage can be also observed in both Bangkok and other cities in Thailand. This is primarily due to the popularity and convenience of private vehicles. In rural areas, motorcycles are frequently used by travelers. Based on statistics from Department of Land Transport (DLT), over 16 million motorcycles have already been registered in regional areas of Thailand. On the supply side, the relatively poor service quality of public transport also contributes to the declining trend of public transport passengers.

Road-based public transport in Vietnam includes urban bus, intercity bus, intra province bus, taxi and (unregulated) motorbike taxi. In 2013, total transport production reached 2,950 million passengers that were carried by 106,876 vehicles (MOT, 2014). Bus service has been most concerned by local and national government for recent years. Among 63 provinces, 54 provinces have bus service with total bus fleet of more than 10,000 vehicles. There are 20 in 63 provinces having finished “The Planning for development of public transport by buses,” implying that the local governments have perceived that bus should be effective in responding to travel demand. In Hanoi and Ho Chi Minh City as large cities, bus has become an important mode to many low income people. In 2011, Hanoi bus carried 420 million passengers while bus in Ho Chi Minh City served for 358 million passengers. However, share of bus is still low comparing to other modes, e.g. 9-10% in Hanoi, 7-8% in Ho Chi Minh City, while 1-1.2% in Hai Phong, Da Nang, Can Tho (MOT, 2014). In Ho Chi Minh City, passenger volume increased rapidly in the period of 2005-2006 due to large investment for bus, however, the passenger volume has reduced somehow since 2011. It was speculated that the quality of bus service in Ho Chi Minh City during 2011 to 2013 reduced because after long time in service many buses bought in 2002 has been deteriorated. Besides, congested traffic made travel by buses become less reliable.

Table 2. Trend of road-based urban public transport and paratransit use in six Asian countries

	Cambodia	Indonesia	Japan	Philippines	Thailand	Vietnam
Large Cities/Metropolitan Areas						
Public Transport : Rail		up	up	up	up	up
Public Transport : Bus		up	down	up	down	up
Paratransit		up	up	down	down	down
Small/Medium-sized Cities						
Public Transport : Rail		up	up			
Public Transport : Bus	up	up	down		down	up
Paratransit	up	up	up	up	down	down

Notes:

Large Cities/Metropolitan Areas are the cities whose population is over 5 million.

Small/Medium-sized Cities are the cities whose population is less than 5 million.

Table 2 indicates the summary of the trend of road-based urban public transport and paratransit use in six Asian countries. In relation to bus mode, except Japan and Thailand, upward trend is observed in both large and small/medium-sized cities of Indonesia, Philippines and Vietnam and perhaps Cambodia. In large cities of Japan and Thailand, the availability of rail mode might affect the trends. In relation to paratransit, the trend is different from country to country and between large and small/medium-sized cities. In Indonesia and Japan, upward trend is observed, while in Thailand and Vietnam downward trend in both large and small/medium-sized cities. In Philippines, downward trend is observed in large cities while upward trend is observed in small/medium-sized cities.

3. GOVERNANCE AND ROAD-BASED URBAN PUBLIC TRANSPORT AND PARATRANSIT

In this section, we review governance aspect of each country in relation to road-based urban public transport and paratransit. We especially focus on the government layer by which each road-based urban public transport is overseen.

In Cambodia, the governmental system is composed of two-tiered, consisting of the national government and the sub-national administration with 3 levels of the capital/provincial level, the municipal/district level and the commune level. The administrations are a part of the Ministry of Interior and their members are appointed by the national government. As of 2013, there are 1 capital, 24 provinces, 26 municipalities, 171 districts and 1633 communes.

Currently in Cambodia, Ministry of Public Works and Transport (MPWT) mandated by the royal government to lead and manage the public works and transport sectors of the country (RGC, 1998) shall oversee all parts of transport issues including public transport and paratransit, but in recent years it has been mainly focused on the rehabilitation and development of roads and bridges and some necessary legal tools for transportation. In relation to the governance of public transport and paratransit in which the combination of traffic engineering, law enforcement, spatial planning and land infrastructure are considered to be essential, there are at least another 2 ministries that are much involved, i.e. the Ministry of Interior (MOI) which is mandated to guide and control all levels of provincial administrative authorities, supervise the national police, protect social order and security, and provide safety to the people (RGC, 1996), and the Ministry of Land Management, Urban Planning and Construction (MLMUPC) which is mandated to lead and manage the affairs of land management, urbanization, construction, cadastre and geography (RGC, 1999). In addition, the relevant capital/provincial and municipal administration at the sub-national level, as a delegated authority to govern within a certain designated territory, also takes a vital role in overseeing and developing public transport and paratransit. However, in practice there are some cross-sectoral issues since the allocation of responsibilities in some specific areas between various levels of government and among agencies is actually uncertain, and constrained by a lack of more detailed legal framework, incompetent institutional arrangement and lack of technical expertise, insufficient financial resources and conflicts of interest between individuals and authorities. For examples, with the above-mentioned mandate, oversight for the transport sector is primarily housed in the MPWT, and it is difficult not to acknowledge that MPWT's responsibilities cut across the operation, ownership, management, and regulation of the entire transport sector except for air transport sharing with State Secretariat for Civil Aviation and rural roads shared exclusively by Ministry of Rural Development. In this context, and without sufficient human and financial support the

capital/provincial and municipal administrations are reluctant to act decisively for the good governance and better development of public transport and transit, but just waiting for guidelines and directions from the national government and act mostly as the implementation authorities. Moreover, some other line ministries such as Ministry of Economy and Finance (MEF), Ministry of Environment (MOE) and Ministry of Industry and Handicraft, and some other autonomous government agencies lead and control a specific part of transport sector within their mandates.

Currently there is no formal intra-city public transport mode in any major city of Cambodia except for Phnom Penh capital city which has just introduced the city bus service in February 2014. A large number of para-transit modes, i.e. motorcycle taxi alias motodop, moto-remorque and cyclo are widely used as informal public transport modes to meet the travel demand in the cities, and motodop is the most common and fastest form that can be found virtually everywhere in downtown. The city bus service in Phnom Penh is currently solely operated by an autonomous bus authority governed by Capital Hall in which public-private partnerships are encouraged with a majority rule by the government. The considerations for licensing of rail and bus operations were mostly based on the ability to maintain and operate the system smoothly and efficiently in which organizational and financial capacity of the operators wishing to engage in are critical for the evaluation. On the other hand, for the paratransit the government does not formally control the operation. Particularly, motodops are not controlled at all by the government and the number in operation is unknown, but moto-remorque owner/operators are required to register their vehicles with Department of Public Works and Transport.

In Indonesia, according to Road Traffic and Public Transport Act (Act no 22 year 2009), the implementation of road public transport is the duty of Indonesian Government, and it should be realized in accordance with the principles and purposes of transport. Road public transport as one of the national transportation modes has to be safe, secure, comfortable and affordable. The act also states that road public transport can only be handled by public company, private company and legal organization, therefore in the future public transport will not be owned by the individual while it is currently existing in urban paratransit called as angkutan kota (Angkot).

The Ministry of Transportation in Indonesia consists of 4 Directorate General : land, railway, sea and air transportation. The Directorate General of Land Transport has 2 main areas of concern. The first area is traffic and road transport, including urban transport and land transport safety and the second inland waterways and ferry transport connecting the different islands. In term of highway public transport system there are 2 departments related in The Directorate General of Land Transportation, the first is the Department of Road Traffic and Transportation, and the second is the Department of Urban Transportation System Development. The second department is the one which is responsible for improvement of urban public transport in Indonesian cities. One of the policies of the department at the moment is the Bus Rapid Transit System in 15 major cities around Indonesia, in order to move people away from private vehicles (cars and motorcycles) and encourage them to use Bus Rapid Transit (BRT). Therefore, the Directorate General of Land Transport is responsible for the organization of a system that provides new vehicle for BRT. They are also responsible for multimodal transport modes, meaning connecting airports, ports, railway stations and bus terminals by providing new intermodal buses.

Indonesia governments, especially Ministry of Transportation, have a duty to make the planning of public transport such as: determination of plan on road public transport route network and the number of fleets, providing infrastructure for road public transport (bus stop and bus terminal), permitting public transport through licensing, providing road transport

fleets by coordinating with local government to make improvement in Urban Transit System, like BRT (Transjakarta), controlling the minimum standard of public transport services, and creating fair competition in public transport services industry. Local government, on the other hand, administrates local paratransit and taxi modes.

Japanese governmental system is composed of 1 national, 47 prefectural and about 1,700 municipal (city, town or village) governments. In relation to the operation of public transport or paratransit, the operators must be licensed by the Minister of Land, Infrastructure, Transport and Tourism (MLITT) at the national level. While most rails, buses and other modes of public transport and paratransit are operated by private companies, some are operated by prefectural or municipal governments, public-private partnerships or nonprofit organizations. It is noted that the licensing of the public transport operations was mostly based on the principle of economic efficiency in the 20th century; the licensing based on the principle of decentralized decision-making has been extended in order to respond to fast-changing local needs with the decrease in population and the increase in aged people.

In 2008, the amendments to Road Transportation Act (RTA) introduced the local public transport committee the members of which are governmental officials, public transport operators, citizens and others in the local area. The objective of the committee is to build the local transport plan in relation to bus and taxi modes for meeting the local demand, which simplifies the part of the national procedure of licensing on the condition that the plan is approved by the committee. In 2009, Act on Revitalization and Rehabilitation of Local Public Transportation Systems (ARRLPTS) institutionalized the local public transport comprehensive coordination committee the objectives of which are to build the local public transport comprehensive coordination plan and to implement the relevant project in relation to heavy/light rails, passenger boats and others as well as buses and taxies. In 2014, the amendments to the ARRLPTS also institutionalized local public transport network formation plan which adds to the previous local public transport comprehensive coordination plan the items of coordination with city planning for realizing compact city structure, and of redevelopment of the area-wide public transport network covering the whole planning area. The plan possibly includes the public transport or paratransit service in a suburban area with low population density. The amendments also introduced local public transport restructuring implementation plan in addition to the existing local public transport restructuring project.

In Japan, former Ministry of Transport (MT), Ministry of Construction (MC), National Land Agency and some other agencies were integrated into MLITT in 2001. Currently MLITT as a whole oversees most part of transport policies and development, however, some internal sectoral aspects are still existing. For example, while bus transport or RTA is overseen by Road Transport Bureau (belonging to former MT), tramway or Act on Rail Tracks is overseen jointly by City Bureau (belonging to former MC) and Railway Bureau (belonging to former MT). The Police oversee road traffic regulated by Road Traffic Act. Some priority measures for public transport needs cooperation of the police. For example, the introduction of Public Transportation Priority System (PTPS) helps the coordination between bus operation and traffic signal system and the enforcement of illegal on-street parking helps bus operation by clearing the right of way. Ministry of Finance, Ministry of Internal Affairs and Communications, Ministry of Economy, Trade and Industry (METI), Ministry of Environment and some other ministries and agencies oversee a specific part of transport policies and development. For example, METI oversees Act on the Measures by Large-Scale Retail Stores for Preservation of Living Environment (AMLSRSPL) which regulates the development of a new shopping mall in terms of parking, traffic circulation around the mall and noise pollution. The parking requirement regulated by the AMLSRSPL may possibly be modified if the new mall is located in the area well served by public transport.

The Philippine administrative system is composed of the national government, 81 provincial, 144 city, 1,490 municipal and 42,028 barangay (village) governments. For purposes of regional planning and regulation by the national government, the country is divided into 16 administrative regions including Metropolitan Manila which is called the National Capital Region (NCR). In Philippines, road-based public transport modes (provincial and city operation) such as buses and paratransit (jeepneys and UV Express) are operated by the private sector ranging from companies to individual operators. Rail-based mass transit in Metro Manila is owned and operated by the national government through the Light Rail Transit Authority (LRTA) except for the MRT Line 3 which is owned by the private sector and operated by the DOTC. The Philippine National Railways (PNR) owns and operates a heavy railway system from Metro Manila to the southern provinces of Luzon including a commuter rail service.

The Department of Transportation and Communications (DOTC) of the Philippines is the primary policy-making, planning, regulatory, and administrative agency of the national government on transportation infrastructure and services. It shares this authority with other government and non-government institutions. The Metro Manila Development Authority (MMDA) plays an important role in traffic engineering and management in Metro Manila, and local government units (LGUs) in the country have their share of regulation of public transport and traffic, particularly the franchising and regulation tricycles (three-wheeler public transport) which have been devolved to towns and cities, and traffic management. The regulatory function is undertaken by the DOTC through the Land Transportation Franchising and Regulatory Board (LTFRB) for public transport services and the Land Transportation Office (LTO) for vehicle regulations. The Road Transportation Planning Division (RTPD) under the Transportation Planning Service of the DOTC is in charge of road transport planning and formulates policy guidelines for the regulatory units. The main function of the LTFRB is to regulate the entry, operations, and exit of buses, taxis and paratransit modes such as jeepneys and utility vehicles operating point-to-point services (UV express) through franchising and other regulatory measures. The franchising of public transport operations is based on Philippine Commonwealth Act No. 146 (Public Service Act) of 1939 where the issuance of a Certificate of Public Convenience (franchise) is determined by public need, as per section 15 of the said Act. The LTO undertakes the inspection and registration of all motor vehicles. Although it has the legal mandate to implement its rules, and adjudicates the cases of violation of franchise-related regulations, the LTFRB does not have the resources to directly enforce its rules on public utilities. It relies on the LTO to help enforce LTFRB regulations through its inspection and registration functions and its ability to apprehend violators of transportation and traffic rules. The enforcement function in Metro Manila is also shared by the MMDA and its constituent LGUs.

In Thailand in general, paratransit and public transport is being regulated by the Department of Land Transport (DLT) under Ministry of Transport. The planning framework of the country's transportation system is carried out by the Office of Transport and Traffic Policy and Planning (OTP). In some regional areas the planning could be conducted by their own local government organizations under the Department of Local Administration.

In Bangkok, public buses are operated by the Bangkok Mass Transit Authority (BMTA), which allows private subcontractors. The major informal transport modes in Bangkok area include passenger vans and motorcycle taxis. They primarily serve as feeder systems to urban rail modes. As of 2012, about 5200 passenger vans are categorized as Category 1 under DLT regulation, serving Bangkok and vicinity areas, while approximately 4,000 passenger vans are under Category 2, serving trips between Bangkok and other provinces. It is also estimated that there are more than 100,000 motorcycle taxis in Bangkok. Both passenger vans and

motorcycle taxis are controlled in terms of both economic and safety regulation by DLT. In provincial areas, the “One license per one route” policy is implemented; however, the licenses can be subcontracted to other operators. The majority of bus services in provincial areas are of small-to-medium scale operators. Due to large investment and sunk cost particularly in vehicles, it is relatively difficult to exit the market, although those operators have to incur constant loss in revenue. Interprovincial routes and those in provincial areas are highly competitive among overlapping route operators. At the same time, they have to compete with passenger van operators that sometimes even provide door-to-door services.

In regional provinces in Thailand, fixed-route buses are supposed to run on a fixed route and on the condition of picking up the passengers at specific locations according to designated fare and stop at regulated bus terminals. However, it may be observed in some areas that some services may not be operated according to such rules. Such difficulty potentially arises from several factors such as insufficient demand along the designated route, overlapping routes, rapid land use development, and the popularity of private motorcycles.

Public transport in Vietnam is developing fast in accordance with economic growth pace. Bus has become the main transit mode with large investment during the last decade. Meanwhile, other paratransit modes are either vanished/replaced or undergo changes to adapt with new regulations and public preference. Beside bus service, public transport systems in cities in Vietnam would be planned and divided into three categories: Category 1: including mass rapid transit, light rail transit or BRT which run along main corridors connecting centers, Category 2: comprised of road based-public transport service with fixed routes and schedules, i.e. bus, and Category 3: including transit services that operate on fixed route (possibly paratransit) or taxi, motorcycle taxi.

With Decision No. 280/QĐ-TTg in 2012 ratifying “the Scheme to develop public transportation by bus from 2012 to 2020,” Ministry of Transport of the National Government perceived that public transport by bus would play an important and strategic role in alleviating traffic congestion, accident and environmental pollution in the stage from 2012 to 2020. Specifically, the Government have decided to develop bus system for cities and provinces to integrate with other transit modes including rail, boat, and paratransit, with the following details:

- For provinces not yet having bus service, the provincial people committee needs to issue regulations that give preferential treatments to operators of new bus routes during initial operation stage.
- Local authorities should consider and decide to subsidize for high-demand bus routes but having revenue lower than expenditure to ensure the stable operation of bus network.
- Give preference loan for buying vehicles for bus service, especially for environmental friendly vehicles such as buses run by LPG or CNG.
- Tax exemption for bus operators when building maintenance house and parking space for buses, according to Decision No 62/2009/QĐ-TTg in 2009 by the Prime Minister.
- Advertisements on buses are allowed to raise fund for bus operation.

Following Decision No. 280/QĐ-TTg in 2012, some local government encourages development of bus fleet. For example, Ho Chi Minh City have decided to develop 1680 new buses from 2014-2017, among which 300 are CNG buses.

Table 3 indicates the summary of government layers and administration of urban public transport and paratransit in each country. The number of government layers and the number of governments belonging to each layer are different from one country to the other. In general, rail modes such as HR, subway and LRT are overseen by national government in each country, while the assignment of the administration on road-based public transport is also different. In Indonesia and Vietnam, the administration on bus and paratransit modes is conducted by local

government, however, in Japan and Philippines, national government still takes the responsibility. Even in Japan and Philippines, it is noted that delegation from national government to local government to some degree is proceeded.

Table 3. Government layers and administration of urban public transport and paratransit

Government Layer	Cambodia	Indonesia	Japan	Philippines	Thailand	Vietnam
1	National	National	National	National	National	National
2 (the number of jurisdictions)	Capital, Province (25)	Province (34)	Prefecture (47)	Province (81)	Provinces (76)	Province (63)
3 (the number of jurisdictions)	Municipality (26)	Regency/City (508)	Municipality (1727)	City/Municipality (1634)	Districts (878)	City (64)
4 (the number of jurisdictions)		District (6994)		barangay (42021)		
4 (others) (the number of jurisdictions)					Bangkok and Pattaya (2)	
Government Layer of Urban Public Transport (Government Layer number refers to the above.)	Cambodia	Indonesia	Japan	Philippines	Thailand	Vietnam
HR, Subway		1	1	1	1	
LRT			1	1	1,4	
BRT		2	1, 3	1	4	
Bus	1, 2	1,2,3	1, 3	1	1,2,4	2, 3
Paratransit	1, 2	2, 3	1, 3	1,2,3	1,2,3,4	2
Taxi	1, 2	3	1	1	1	2, 3
Others	Small truck 1, 2	Motorcycle taxi 3 Pedicab 3 Bicycle taxi 3	AGT 1 Monorail 1			

Notes:

In Japan, after the Act on Revitalization and Rehabilitation of Local Public Transportation Systems (ARRLPTS) in 2009, the relevant power of municipal government is reinforced.

In the Philippines, the Local Government Code of 1991 devolved the functions of regulation of operation of three-wheeled paratransit modes such as tricycles and pedicabs to municipalities and cities

4. URBAN PLANNING AND ROAD-BASED URBAN PUBLIC TRANSPORT AND PARATRANSIT

In this section, we discuss urban planning aspect in relation to road-based urban public transport and paratransit in six Asian countries. We especially focus on zoning or initiative for Transit Oriented Development (TOD), traffic impact assessment and land development permission since they are significant mechanisms for coordinating land use and public transport development within several other urban planning measures.

In Cambodia, in relation to planning, based on Law on Land Management, Urban Planning and Construction (RGC, 1994) and National Policy on Spatial Planning (RGC, 2011), national and regional spatial planning shall be prepared by National Committee on Land Management and Urban Planning led by Ministry of Land Management, Urban Planning and Construction. Up to now, only a few plans were officially approved by the government. On the other hand, urban transport plans have never been conducted for any

municipality, only two plans, i.e. Urban Transport Master Plan 2001 and Comprehensive Urban Transport Plan 2014 have been conducted for Phnom Penh capital city with the assistance by JICA. However, some other important legal instruments for controlling land use and developments such as Sub-decree on Urban Planning which is being finalized and the existing Law on Land Management, Urban Planning and Construction which is being revised and ready for amendment will be come into force and will improve the situation. The draft Sub-decree on Urban Planning will strengthen development control and encourage higher mixed land use densities and promotion of viable and efficient public transport which has long been underdeveloped. On the other hand, the draft Law on Land Management, Urban Planning and Construction introduces a new regulation for impact assessments of land development projects on land management and urban planning policies which will include for the traffic impact assessment.

The Indonesia Spatial Planning Act Number 26 of 2007 stated that there should be a plan on provision and utilization of public transport infrastructure and pedestrian facility network, informal sector activities, disaster evacuation area, which is required for the city's function as the center of economic and social services in the region. The Law of The Republic of Indonesia Number 22 of 2009 on the Road Traffic and Transportation stated that for the case of the construction/development of the property such as residential, shopping center, apartment, and so on, it is necessary to conduct the analysis of traffic impact. Further stipulation on Traffic Impact Analysis is regulated on Government Regulation Number 32 of 2011 concerning The Management and Engineering, Impact Analysis, and the Requirement of Traffic Management. According to the Article 47 of Government Regulation Number 32 of 2011, every plan to construct activity centre, residential, and infrastructure that will cause disturbance on security, safety, orderliness, and the smoothness of the traffic and public transport shall conduct Traffic Impact Analysis. However, there is no specific regulation in relation to public transport and paratransit on Traffic Impact Analysis. The result of Traffic Impact Analysis is required for the developer or builder in order to obtain the document of location permit, land development permission and advisory planning (the building construction permit with specific function in accordance with the legislations in building construction aspect).

While City Planning Act (CPA) is overseen by MLITT in Japan, land use planning under CPA is conducted by prefectural and municipal governments after decentralization. There are several issues in relation to the coordination between land use and transport planning. For example, while most Japanese cities are compact with relatively high population density, the gap between land development mostly conducted by private companies and transport infrastructure development mostly conducted by public or publicly-regulated private companies has induced a long trend of urban sprawl. It has decreased population density of most Japanese cities, which increases car use and worsens sustainability of urban public transport. In 2014, MLITT amended the Act on Special Measures concerning Urban Reconstruction (ASMUR). The Act requires municipal government to build the Location Adjustment Plan which should be comprehensive master plan containing the location of residential function, the locations of welfare, medical, shopping and other urban functions and the promotion of public transport from the perspective of the city as a whole. The Act is also expected to provide the basis for inducing private sector investment in urban functions and effective relocation of residential function. The new zoning categories of the area for inducing urban functions and the area for inducing residential function are introduced for realizing compact city structure with multipolar network. The Act also requires the coordination with the amendments to the ARRLPTS in 2014, which further contributes to compact city structure with multipolar network by

supporting Transit Oriented Development or the relocation of urban functions around rail stations and major bus stops.

While ASMUR in Japan is to induce compact city structure with multipolar network from the perspective of city as a whole, there have been some other measures for coordinating between land use and transport planning. One of the criteria included in the Land Development Permission (LDP) under CPA introduced in 1968, with relevant ordinances and guidelines regulated by prefectural and municipal governments, is operated in order for the coordination. The LDP requires an implementing body for the land development with 40 hectares or beyond must indicate that the development is well-served by road, rail transport, or other modes of transport. Before obtaining the LDP from the local government, the implementing body needs to consider the relevant location for the large-scale development where the coordination between land use and transport can be expected.

While the target of LDP in Japan is land development, the target of Traffic Impact Assessment for Large-Scale Development (TIA) by prefectural and municipal governments is building development whose floor space is 10,000 square meters or more for shopping use and 20,000 square meters or more for office use. In case the developmental traffic is forecast to exceed the capacity of road infrastructure of the development, the implementation body of that development needs to reduce the demand of developmental traffic, by promoting public transport use for example, or to reduce the scale of the development. During the Assessment, the implementation body of the development is possibly required to contribute transport infrastructure development for the surrounding area aside from the target area. Within the frameworks of ASMUR, LDP, and TIA well include the coordination of land use and public transport, they do not include the coordination with paratransit except ASMUR.

In Philippines, in terms of local development planning, the Local Government Code (LGC) of 1991 clearly defines urban planning and management and as a primary responsibility of the local government units. More specifically, this responsibility includes land use planning and the application of appropriate local development controls that should consistent with national and provincial plans and policies. While good city-specific plans and policies are crafted by the respective local governments, weak coordination and integration among such plans and policies have not ensured sustainable development for the region as a whole (Tiglaio and Vergel, 2007). The preparation of Comprehensive Land Use Plans (CLUPs) are guided by minimum technical requirements and standards issued by the Housing and Land Use Regulatory Board (HLURB). One shortcoming in the present planning system in the Philippines is that the consideration of urban transport issues (that pervades across all development sectors) is not explicitly tackled. Traffic impact assessment (TIA) has been required by the HLURB for large residential developments. Some local governments (example Laguna Province and some cities in Metro Manila) have started to require TIA for condominium and commercial (shopping mall) developments. However, there is still not yet coordinated and connected with urban public transport planning for the city.

In Thailand, the transit oriented development (TOD) concept is under investigation for both existing and future urban rail systems. Such a concept is incorporated during the planning phase of future urban rail network in order to promote accessibility of commuters to public transport and encourage more transit ridership. In addition, land use control and development have been planned in tandem along with the future mass transit lines. The traffic impact assessment (TIA) in Thailand is typically conducted as a part of the environmental impact assessment (EIA). Developers whose the project occupies more than 300 parking units or larger than 2,000 square meters of gross floor areas are required to conduct the environmental impact study (Limapornwanitch *et al.*, 2005). Several Acts are involved in land use control for transportation project and development, including, the Town and Country

Planning Act of 1975, Building Control Act of 1992, Land Development Act of 1992, and the Enhancement and Conservation of National Environmental Quality Act of 1992.

In Vietnam, together with bus development, regulations on various fields have been issued to control the operation of difference transit modes. Land use control, environment protection, subsidy have been concerned for the development of public transport, especially bus service. Besides, the concept of transit orient development (TOD) has also been integrated more into land use planning. For example, in Ho Chi Minh City when planning mass rapid transit projects, in addition to traffic impact assessment, land use in the walkable catchment area around the stations has been separately modified for TOD. That could be minor changes to the existing land use zoning of the vicinity so that more facilities, i.e. parking or bus interchange will be planned to support the use of the rail. Additionally, as a result of rail station locating, changing land use purpose of a specific land strip has been implemented together with calls for investment for land development. According to the Public Transport Operation Center (2014), public transportation and land use in Vietnam are now purported to involve each other, especially in the vicinity of the TOD area. In municipal area, land use planning should be combined with public transportation planning in three levels: ward planning, district planning, and city planning, which means that land use control at each level should be integrated from planning to design of a specific public transport facility. For example, designing terminals or stations is now required multi-modal connection which means that it should allow smooth accessibility of passengers using various modes like walking, buses, motorcycles or even cars. Besides, construction projects on a specific land plot need to ensure connectivity with public transportation.

Table 4 summarize urban planning aspect in relation to road-based urban public transport and paratransit in six Asian countries. Among three urban planning measures, zoning for Transit Oriented Development (TOD) and land development permission are implemented in all six countries. However, coordination with public transport through these two mechanisms is not necessarily established, and no coordination is found for the case of paratransit. In relation to traffic impact assessment, the mechanism is used in relation to public transport in some countries, which might contribute to the coordination between land use and public transport planning.

Table 4. Coordination of urban planning and urban public transport and paratransit planning

	Cambodia	Indonesia	Japan	Philippines	Thailand	Vietnam
Zoning (TOD)	Existing	Existing	Existing	Existing	Existing	Existing
: Government Layer	1,2,3	2, 3	2, 3	3	1,2,3,4	2, 3
: Public Transport	No	Yes	Yes	No	Yes	Possibly
: Paratransit	No	No	No	No	No	No
Traffic Impact Assessment	Non-existing	Existing	Existing	Existing	Existing under EIA	Not clearly defined
: Government Layer		2, 3	2, 3	2, 3	1,4	2
: Public Transport		Yes	Yes	No	Yes	Possibly
: Paratransit		No	No	No	No	No
Land Development Permission	Existing	Existing	Existing	Existing	Existing	Existing
: Government Layer	1,2,3	2, 3	2, 3	2, 3	1,2,4	2
: Public Transport	No	Yes	Yes	No	Yes	Yes
: Paratransit	No	No	No	No	No	No

Note: Government Layer number refers to Table 3.

5. FINANCIAL ASPECT AND ROAD-BASED URBAN PUBLIC TRANSPORT AND PARATRANSIT

Finally in this section, we briefly discuss financial aspect in relation to road-based urban

public transport and paratransit in the six Asian countries. Table 5 indicates financial policy for public transport and paratransit from the viewpoint of subsidy, tax and other financial aspect. It is found that the six countries share many common policies in this aspect. Therefore, we review the aspect by selecting some countries where significant policies are adopted.

Table 5. Financial policy for public transport and paratransit

	Cambodia	Indonesia	Japan	Philippines	Thailand	Vietnam
Public Transport	Bus	Bus, BRT	Bus, BRT	Bus	Bus	Bus
Subsidy	Operation, Vehicle, System	Operation, Vehicle, bus stop, terminal	Operation, Vehicle, Barrier-free Facilities, System		Operation, Vehicle, System	subsidy on cost, free ticket to elderly, low interest loan for buying vehicles
Tax	Registration, Ownership, Fuel	Registration, ownership, route and vehicle inspection	Registration, Ownership, Fuel, Consumption	Ownership, Consumption, Registration, Motor Vehicle User's Charge, Common Carriers, Fuel	Registration, Fuel Consumption	Exemption: VAT, vehicle spare part import tax; discount on: toll fee
Others			Eco-vehicle Tax Discount		Free bus policy in Bangkok (temporary)	Free land renting for bus parking space and maintenance house
Paratransit (Representative)	Moto-remorque	Angkot	Shared Taxi, DRT	Jeepney	Motorcycle taxi	12-seat bus
Subsidy		few city operation only for student	Operation, Vehicle, Barrier-free Facilities, System			subsidy on cost, free ticket to elderly, low interest loan for buying vehicles
Tax	Registration, Ownership, Fuel	Registration, ownership, route and vehicle inspection	Registration, Ownership, Fuel, Consumption	Ownership, Consumption, Registration, Motor Vehicle User's Charge, Common Carriers, Fuel	Registration, Fuel Consumption	Exemption: VAT, vehicle spare part import tax; discount on: toll fee
Others			Eco-vehicle Tax Discount	diesel fuel discount		Free land renting for bus parking space and maintenance house

In Indonesia, the regulation of Road Transport and Traffic Act Number 22 year 2009 stated that the granting of subsidies for public transit shall be given by the Indonesian government, following the level of government, e.g. provincial government will give subsidy to regional intercity bus operating only within the province area. Moreover, new regulation of road transport which is called as government regulation Number 74 year 2014 stated that in the future government shall give a subsidy to public transport following their local government revenue. This regulation stated that, depending on each local revenues, the local government shall give a subsidy to public transport. For example, in some cities of East Java Province (Kediri and Malang) there is a trend that local government will give free subsidy to student travelled using angkot. The local government will pay certain amount of subsidy to each angkot for each student passenger. In Indonesia, it is also noted that gasoline price had long been subsidized. The subsidy was abolished in 2015, however, it has contributed much to promoting use of private modes and discourage the use of urban public transport and paratransit modes.

In Japan, while economic efficiency is in principle required for public transport, under the ARRLPTS, there are several schemes of subsidy from national and local governments. From national government, for the maintenance of local public transport, trunk and feeder road-based public transport operation can be partly subsidized in the areas with serious population decrease while bus service is necessary. The cost of the vehicles under the separation of infrastructure from operation is also partly subsidized. For the barrier-free promotion of local public transport, the cost for the introduction of non-step bus and the center for welfare taxi allocation as well as the cost for the promotion of barrier-free concept in rail stations and bus terminals is subsidized. As well as public transport operators, paratransit operators might also be able to receive subsidy if the conditions are satisfied.

In Philippines, in general, there are no subsidies are provided for road-based public

transport and paratransit. To cushion the effect of increasing oil prices especially on the public transport, refuelling stations started providing diesel discounts of 0.5 peso per liter in 2004 for public utility vehicles and this rose to 1 peso per liter in recent years. Most units of public utility jeepneys use diesel as fuel. In 2011, fuel subsidy cards (worth 1,050 pesos) were distributed to jeepney drivers nationwide by the Department of Energy. The program was a temporary measure intended to mitigate the effects of oil price increases on jeepney and tricycle drivers.

In Thailand, the public transport is heavily subsidized by the government, especially for the case of state-owned bus operator Bangkok Mass Transit Authority (BMTA). Currently, BMTA has accrued debt of over 90 billion Baht. Another public transport subsidy in Thailand comes in the form of free bus and train services. The main objective of the subsidy is to help offset the rising cost of living. Up until present, approximately 800 buses are allocated daily in Bangkok and nearby provinces to provide the free service in 73 routes. Such a program has been extended several times by the cabinet but it is expected to end in the future. On the other hand, the first car tax rebate program in Thailand was proposed during the year 2011-2012. Applicants must be first-time car buyers and eligible vehicles must not be worth more than one million Baht, with an engine capacity not exceeding 1,500 cc. Under this controversial program, car buyers could get a refund for the actual amount of tax they paid for the car with a maximum amount of 100,000 baht per unit. As a result, over 1.2 million people signed up for the scheme between September 2011 and December 2012.

In all the six Asian countries, we found that bus modes are subsidized in terms of capital and operating cost, while paratransit modes are not subsidized. The exception in terms of the subsidy to paratransit is Japan where paratransit mode services in the area with serious population decrease. It is noted that the background of use of paratransit is quite different in Japan from the other countries in this study, and that the national government in Indonesia plans to prepare subsidy to paratransit in the regions where its use is on the decrease. Indonesian case might indicate that even paratransit modes in some developing countries might receive subsidy in future in order to meet transport demand for the people who do not have access to the car.

6. CONCLUSIONS AND FURTHER STUDIES

In this study, we conducted an international comparative study on road-based urban public transport policies in six Asian countries: Cambodia, Indonesia, Japan, Philippines, Thailand and Vietnam. We paid attention especially to governance, urban planning and financial aspects as important background factors for considering road-based urban public transport policies.

In conclusions, first, in general, rail modes such as HR, subway and LRT are overseen by national government in each country, while the assignment of the administration on road-based public transport is different in the six Asian countries. In Indonesia and Vietnam, the administration on bus and paratransit modes is conducted by local government, however, in Japan and Philippines, national government still takes the responsibility. Even in Japan and Philippines, it is noted that delegation from national government to local government to some degree is proceeded.

Second, among three urban planning measures, zoning for Transit Oriented Development (TOD) and land development permission are implemented in all six countries. However, coordination with public transport through these two mechanisms is not necessarily established, and no coordination is found for the case of paratransit. In relation to traffic

impact assessment, the mechanism is used in relation to public transport in some countries, which might contribute to the coordination between land use and public transport planning.

Finally, in relation to financial policy for public transport and paratransit, it is found that the six countries share many common policies in this aspect. We found that bus modes are subsidized in terms of capital and operating cost, while paratransit modes are not subsidized. The exception in terms of the subsidy to paratransit is Japan where paratransit mode services in the area with serious population decrease. It is noted that the background of use of paratransit is quite different in Japan from the other countries in this study, and that the national government in Indonesia plans to prepare subsidy to paratransit in the regions where its use is on the decrease. Indonesian case might indicate that even paratransit modes in some developing countries might receive subsidy in future in order to meet transport demand for the people who cannot have access to the car.

So long as the people who cannot have access to the car remain, the provisions of public transport or paratransit become necessary. When public transport or paratransit is not financially self-sustaining, the national government in most cases might need to institutionalize the subsidy to these modes. Urban planning measures if properly implemented can also contribute to leveraging public transport and paratransit uses and to reducing subsidy for sustaining these modes.

For further studies, the number of countries in this study is limited. In order to understand road-based urban public transport policy with its background more deeply, the number should be extended. Also, in this study, we did not discuss some important aspects in relation to road-based urban public transport such as environment, safety, and social aspects. By including these aspects, we will be able to generate better urban public transport policies in Asian countries.

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