Comparative Study on Institutional System of Urban Bus Transportation: Bangkok, Hanoi, Singapore, Tokyo, and Yangon

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Abstract: This paper reviews the current statutory and operational system of urban bus service and reports the impacts of the regulation system on the local bus market in five mega cities in Asia: Bangkok, Hanoi, Singapore, Tokyo, and Yangon. The bus-related laws/acts are collected through interviews with government officials in the cities. The results show that the definition of vehicle types, the fare regulations, responsibilities of public and private sectors, and the permission system of urban bus operation vary among the cities. Then, the paper proposes the Index of Market Intervention for Urban Bus with which the degree of market intervention by the government is evaluated in a given bus market. Finally, the paper presents the recommendations: the differentiation of regulation for small-sized vehicles from that for large-sized vehicles, the transparent decision-making process of fare setting in unstable markets, and the private management under the well-organized control of government.

Key Words: urban bus service, comparative analysis, institutional system, regulation framework

1. INTRODUCTION

Buses are one of the most principal transportation modes in many developing urban areas. This is also the case in major cities of the Southeast Asia Region (SEAR). Local people use the bus for home-to-work, home-to-school, business, and private travel. However, the rapid motorization has caused the inefficient use of road space, traffic congestion, and serious air pollution in the major cities in the SEAR while it damages the ridership of public transportation including buses (Ieda, 2010). Thus an active policy favoring public transportation is required to generate quality transportation alternatives that can compete with private cars (Munoz and Grange, 2010). It is widely agreed that the bus market should be regulated to correct the distortions of the market in the transportation sector (Button, 1993). In reality, the bus regulatory system seems to vary among the cities/countries. This is probably because the bus regulatory system is highly dependent on the characteristics of local transportation market. A special issue in Research in Transportation Economics reports the recent experiences of bus market regulation and management in various countries, including Augustin and Walter (2010), Gibson (2010), Jansson and Pyddoke (2010), Muñoz and de Grange (2010), Rolim et al. (2010), and Sakai and Shoji (2010). However, the urban bus systems in the SEAR have not been well reported, in particular they have never been compared from a single perspective. Although the experience of bus reform in one city may be useful for the bus system in another city, such information has not been shared among the
bus regulators in the SEAR. Then this paper aims to compare the urban bus transportation systems among four major mega cities in the SEAR and Tokyo, Japan and to withdraw the lessons from them. The cities in the SEAR are Bangkok in Thailand, Hanoi in Vietnam, Singapore, and Yangon in Myanmar. The data including the statutory system and the current operations of bus transportation in those cities are collected through the half-structured interviews and paper-based questionnaire surveys to bus authorities.

The paper is organized as follows: the next section reviews the statutory system and its operation of urban bus service in the five cities. They include the overview of the bus market, the operational authority, and the statutory framework on operation and fare setting. Then, they are compared from the viewpoints of the license system, the permission system, competition type, fare regulation, and the degree of governmental intervention into the bus market. Finally, the achievements are summarized with lessons learned from the analysis and further research issues and recommendations are presented. The interviews and literature reviews of laws/acts were carried out in September to December 2008. Thus, it should be noted that general information and data pertaining to the five cities before 2008 were used in this study.

2. STATUTORY SYSTEM AND ITS OPERATION OF URBAN BUS SERVICE IN FIVE CITIES

2.1. Bangkok

2.1.1. Overview of urban bus transportation system in Bangkok

In Bangkok the urban bus provides the main route service along major streets whereas the para-transit including Songthaew, Silor Lek, and motorcycle taxis provides a feeder service in the narrow dead-end side branching off major streets. Bus accounts for 37 percent in passengers among the three existing transportation modes including railway (subway), buses, and other automobiles in the Bangkok Metropolitan Region (OTP-IMAC, 2004). The operation and management of urban buses in Bangkok are delegated to the Bangkok Mass Transit Authority (BMTA). Approximately 51 percent of its stocks are owned by the state government. Currently it operates mini buses, vans, off-main-road buses as well as regular buses. In recent years, the BMTA has faced serious financial problems. This is mainly because the fare is regulated to be too low to cover the operational cost and this leads to unprofitable operations on most of routes. This resulted in the annual loss of 508 million baht in March 2007 (Bangkok Mass Transit Authority, 2007). The BMTA has been issuing own bonds to compensate these losses.

2.1.2. Statutory framework of urban bus regulation in Bangkok

Thai central government is responsible for urban public transportation in Bangkok, which includes the Office of Transport & Traffic Policy and Planning, the Department of Land Transport, and the BMTA. In Thailand, there are two acts regulating the urban bus services: 1979 Land Transport Act and 1979 Motor Car Act. Although there is no definition of or limitation on the capacity of buses, Section 4 in the 1979 Land Transport Act defines public service motor cars including taxis as those with the capacity of seven seats or less, which are distinguished from buses. Public transportations are categorized into the three types by its route and by vehicle size: Fixed route transport service, Non-fixed-route transport service, and Transport service with a small-vehicle.
The BMTA is in charge of both planning and operating urban bus services for local people who reside and work in Bangkok and nearby provinces. It has the monopolistic power on the urban bus service. To start the urban bus service, local bus operators are required to pay a registration fee, 500 baht for a large bus and 300 baht for a small bus every seven years. Routes are also determined by the BMTA. Approximately 24 percent of total routes are operated by private companies as a joint service with the BMTA (BMTA, 2007).

The fare setting process is vaguely defined in the acts/laws. The Central Land Transport Control Board (CLTCB) has authority to fix the fare rates of transportation and other service charges. Note that the fare regulation is not presented in any act/law. However, those charges are often determined by referring to the discussions in the Cabinet. The two types of fare systems have been introduced: a flat rate system for non-air-conditioned buses and a distance-based rate system for air-conditioned buses. Regular basic buses in Bangkok set under the flat rate system with seven baht as the lowest price of bus services, which is primarily determined by the central government. The fare table of the urban bus service except the regular buses is basically calculated under the cost-plus pricing, which determines the fare on the basis of the estimated total cost. Section 23 of the 1979 Local Transport Act presents the following four types of licenses by route and by vehicle size: a fixed-route, a non-fixed-route, a small-vehicle, and a private transportation. Section 27 of the 1979 Local Transport Act prescribes the principles and processes of licensing. The license of the fixed-route transportation is valid for seven years while the licenses of non-fixed routes and small-vehicle transportation are valid for five years. These licenses are given by the provincial board under the Ministerial regulation.

2.2. Hanoi

2.2.1. Overview of urban bus transportation system in Hanoi

The bus is the only available urban public transportation in Hanoi. However, recent traffic surveys show that motorcycles account for 85 percent of vehicles in the city and cars account for 5 percent and buses for 9 percent in 2007 (JICA, 2007). The urban bus service in Hanoi is provided by the Hanoi Bus Company under the Transport and Public Works Service (TUPWS). The Transport Management and Operation Center (TRAMOC) is a main administrative body in the urban bus market of Hanoi. It was established by the Decision No. 3527/QĐ-UBND of the Hanoi People's Committee (HPC) in 1998. Its main function is to support the Director of TUPWS to manage and operate public transportation in the city. In 2001, the Hanoi local government merged all local buses into a single company called TRANSERCO. TRANSERCO was a state owned enterprise under the control of TUPWS and a single bus operator in Hanoi before 2004. TRANSERCO is currently the main bus operator in the urban area, which operates 48 lines out of 60 urban bus lines in Hanoi as of November 2008. Although the vehicles operated by TRANSERCO were purchased by the city authority, the revenues of TRANSERCO cannot cover their operating expenses. The operating subsidy from the government was about VND160bn in 2001 to 2003 (World Bank, 2004). Note that the public bus service in Hanoi has been drastically changed in the past 15 years while the bus and tram ridership fell into one-tenth in 1997 after the economic reform in 1986 for socialist-based market economy, known as “Doi Moi” policy (Boothroyd and Pham, 2000). The fleet size almost tripled from 2001 to 2003 while the bus passengers increased to almost 15 times from 2001 to 2004 (World Bank, 2004).

2.2.2. Statutory framework of urban bus regulation

The public transportation is generally regulated by local municipalities in Vietnam. In Hanoi,
the decisions relating to the bus service regulations are made on the basis of the official documents including Decisions and Decrees, i.e. Decision No: 35/2005/QD-UB, No: 1000/QD-UBND, No: 130/2005/QD-UB, No:71/2004/QD-UB, and No: 46/2005/QD-UB. The central government announced the Decree No. 110/2006/ND-CP in 2006, which prescribes the transportation business including buses, taxis, and other hired vehicle services. The Law on Land Traffic defines the motor vehicles including buses. The motor vehicles are defined and categorized by their driver licenses including the capacity or size of vehicle in the law. It is necessary to use the motor vehicles with the capacity of over 17 seats in order to apply for bidding for a bus route service in Hanoi (Article 7, Decree No:110/2006/ND-CP).

The Decision No.71/2004/QD-UB requires a bidding process for determining a bus operator. Although TRANSERCO used to be a monopoly, other operators also operate 20 percent of routes after the introduction of the Decision. To get a permission, the bus operator is required to satisfy all criteria including quality and quantity of bus services presented in a bid invitation document, a contract, and the rules presented in the Decision. As for the license or permission for bus operation, Article 61 of the Law on Land Road Traffic prescribes that mass transit cars must run along the routes determined by the Minister of Communications and Transport. A bid winner reserves its right to operate the bus service in a route during at least 3 years. The contract can be extended if the operator maintains its good service quality and successfully reduces its costs.

No law/act describes the bus fare and the process of fare setting in Vietnam. Our interviews revealed that no formal policy is explicitly presented on the fares of bus services in Hanoi. Instead, there is a guideline requiring the bus fare to be affordable and to be not more than 10 percent of worker’s salaries. Currently Decision No:35/2005/QB-UB presents that the fare of a single journey ticket is 3,000, 4,000, or 5,000 VND by distance while it also presents that the fare of a monthly ticket is 50,000VND/ticket/month for a single route and 80,000 VND/ticket/month for multiple routes respectively.

2.3. Singapore
2.3.1. Overview of bus transportation system
Mass Rapid Transit (MRT), Light Rail Transit (LRT), and urban buses are widely used as public transportation in Singapore. Unique taxation/charging schemes and regulations such as the vehicle quota scheme and the electronic road pricing have contributed to reducing the use of automobiles. The urban bus accounts for more than 30 percent among all transportation modes (Land Transport Authority, 2009). Currently, two public transportation operators, SBST and SMRT supply the basic bus services in Singapore. They have responsibilities in both planning and operating the bus services within the assigned areas and they can propose new bus routes other than their assigned areas. They also operate MRT and LRT as well as bus services with an integrated fare structure and the physical connection. The Public Transport Council (PTC), which was established in 1987 as an independent body for bus services, approves and regulates public transportation services, fares, and ticket payment services. The PTC sets the basic bus service standards to safeguard commuters’ interest in terms of bus service provision while the bus operators plan and operate the bus services. The Land Transport Authority (LTA) established in 1995 is an agent and a technical advisor of the PTC.

2.3.2. Statutory framework of urban bus regulation
There are the two acts relating to bus transportation system in Singapore: the Public
Transport Council Act (PTC Act) and the Road Traffic Act. The bus and bus service are defined in the PTC Act. The capacity of bus is defined to be no less than 9 passengers excluding a driver.

There are the two types of licenses for bus operation: one is the bus service license which is required for every operator and the other is the bus operator’s license which is required for those with over ten vehicles. The PTC Act requires the bus operators to satisfy the eight conditions to achieve the bus service licenses while it requires them to satisfy 10 additional conditions to achieve the bus operator’s license. The conditions required for the bus operator’s license include the Quality of Service (QoS) standards, the codes of practices, and the directions issued by the PTC. Note that the QoS standard covers reliability, loading, safety, availability, integration, and information. Currently, financial penalties would be imposed on any bus operator that fails to meet the QoS standards although it exempts the small-scale private bus operators. Additionally the bus operators are required to have the Universal Service Obligations (USO), the headway requirement or Fuel Equalisation Fund (FEF) system by PTC to keep their operator’s license.

The bus operators must get the approval from the PTC to set/change the bus fare. The bus fare is regulated on the basis of the price-cap regulation in which the operators can change the fare unless it exceeds the maximum price approved by the PTC. The maximum fares are adjusted every year on the basis of the given formula given by the PTC Act. The formula incorporates the dynamics of the Consumer Price Index and Average Monthly Earnings.

2.4. Tokyo
2.4.1. Overview of bus transportation system
The local bus sector in Japan has been declined in the ridership and currently accounts for only seven percent among transportation modes while regional/urban railway accounts for 88 percent in the Tokyo Metropolitan Area (TMA) (Ministry of Land, Infrastructure, Transport and Tourism, 2009). TMA covers a transportation area 50km in radius and the railway and subway network have been well developed all over the area. The bus operations are regulated by the national government while only minor relative announcements are given by the local authority or municipality. Japanese bus market was deregulated in 2002 abolishing the demand-supply adjustment and prohibiting the cross-subsidies among routes. Main changes of the deregulation are (1) the market entry/withdrawal system was changed from a licensing system to an approval system, (2) the fixed (compulsory) fare price was changed to ceiling price regulation, and (3) entry/withdrawal regulation was also changed from permission requirement to submission of notification. Furthermore, anti-cream skimming regulation was established and only notification is required for the scheduling. Terada (2004) reports the increase of the new entries into bus business by private companies and the withdrawal from unprofitable route, particularly in rural area, after the deregulation. Operators can operate by either route-based or garage based contract. Private operators tend to undertake the route-based contract while public operators undertake the garage-based on a gross-cost contract for five-years under the strategic-tactical-operational framework (Sakai and Shoji, 2010). Sakai and Shoji (2010) revealed that the public bus operators are especially in low fare-box ratio compared with private-owned operators because of their provision of services in unprofitable routes.

2.4.2. Statutory framework of urban bus regulation
There are the two acts relating to bus operation systems in Japan: the Road Transportation
Act and the Act for Enforcement of the Road Transportation Act. The Road Transportation Act requires the bus operators to get permission from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) to start the profit-based bus operation. To quit the bus service, the bus operators are required to notify MLIT six months in advance. The use of vehicles for bus transportation services is regulated by the Road Transport Vehicle Act. Currently, the conventional taxi vehicles are even available as a community bus since the previous regulation about the seat number per bus vehicle, 11 seats at the minimum, was abolished after deregulation. In addition, the local district transportation bureaus often issue their own public announcements relating to the local bus service, for example, the Tokyo District Transport Bureau issues the public announcement about three defined types of bus operations: a fixed schedule operation, a fixed non-scheduled operation, and an area operation.

The bus fare is regulated on the basis of the ceiling price regulation in which the operators are required to set the fare no more than the maximum fare approved by MLIT. The maximum fare should be determined on the basis of the adequate cost plus profit where the “adequate cost” is estimated with the average operational cost in each operational block. To set or change the fare, the bus operators are required to propose a new fare to MLIT before setting or changing it. The proposed fare would be approved if it is under the maximum fare with which the adequate profit is expected. In practice, there are three types of fare system: a distance-based fare rate system, a flat fare rate system, and a special-section fare rate system.

2.5. Yangon
2.5.1. Overview of bus transportation system
Most people who commute from suburban areas to the central business district use the bus transportation service in Yangon and various sizes of vehicles are used for it. Minibuses generally have become the dominant mode in the city and recent study revealed the bus transportation accounts for more than 70 percent in transportation mode (Zhang et al, 2008). There are two types of local bus services: bus services provided by bus companies and those managed by bus control committees (BCCs). The bus companies are large-scale private bus operators who own the buses, hire the drivers/conductors, and operate urban bus services. Two bus companies currently provide bus services: the Golden City Link Co. (GCL) and the Union of Myanmar Economic Holdings Limited (UMEHL). The BCCs are nonprofit organizations that control small-scale individual bus owners. The owners have their own buses, which are leased to the drivers and conductors. There are numerous individual bus owners in Yangon and they must belong to one of the BCCs. Bus operations and fares are approved by the Yangon Division Peace and Development Council (YDPDC). However, the government does not provide any subsidy program for bus operations. Furthermore, no official strategic urban transportation plan has been devised so far and insufficient management causes on-the-road competition and the service level, especially safety, is remarkably low. The following problems of urban bus operation in Yangon are observed: poor condition of the vehicles, operation control and perception of safety, lack of financial support and regulation system, and inadequate route bus network such as the point-to-point type network (Kato et al., 2010).

2.5.2. Statutory framework of urban bus regulation
Two laws are implemented for regulating bus transportation: the Road Transport and Inland Water Transport Law 1963 and Motor Vehicles Law 1964. The Motor Vehicles Law 1964 covers registration, insurance, owning and driving license, control of traffic speed, and
offenses and penalties for violation in regard to motor vehicles. Motor Vehicle Rules 1989 were enacted under Section 33 of the Motor Vehicles Law 1964 prescribing the issues related to motor vehicles overall such as registration, maintenance, terms and conditions, or traffic rules for vehicles, pedestrians, and cyclists. There is no general definition of buses in these laws but Motor Vehicles Rules 1989 prescribe the category of “Hired Motor Vehicle” which can include urban buses. The “Hired Motor Vehicles” include not only bus vehicles or trucks, but also taxies or other small-capacity vehicles and taxi services by motor cycles are prohibited in Myanmar since motor cycles are not included in the category. Although there is no rule regarding the process to determine the bus fare, Section 108 of Motor Vehicle Rules 1989 states that the authorities are responsible for determining the rates of transportation fares. To operate the “Hired Motor Vehicle,” the operators are required to conduct business by law (Section 102, Motor Vehicle Rules 1989). To operate a public transportation service in Yangon, bus operators are required to possess an operating license “B”, which is valid for a year. After accepting for an operating license by the Transport Planning Department (TPD), the TPD requests the Road Transport Administration Department (RTAD) to inspect the vehicle for operation. The RTAD will inspect the vehicle in accordance with the regulations and report the results to the TPD.

Bus fares are strictly controlled by the YDPDC. When a bus company or a BCC wants to change its fare system, they must submit their plan to the YDPDC and obtain permission. The decision making process for the bus fare system in the YDPDC is not clear although YDPDC has some criteria to accept proposals which include bus service demand, existing supply, and mobility of lower-income individuals.

### 2.6. Summary of statutory system in the five cities

Tables 1, 2, and 3 show the summaries of definition of operation types, statutory regulation on license to operate bus services, and regulation on fare in five cities, respectively.

<table>
<thead>
<tr>
<th>City</th>
<th>Definition of bus operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok</td>
<td>“Fixed route transport” means the transport for reward on the routes fixed by the Board. “Non-fixed route transport” means the transport for reward without restriction of routes. “Transport by small vehicle” means the transport of passengers and things combined for a reward on the routes fixed by the Board with the use of a vehicle of a combined weight of the vehicle and the load not more than three thousand five hundred kilograms. (Sec.4, 1979 Land Transport Act)</td>
</tr>
<tr>
<td>Hanoi</td>
<td>Mass transit cars must run on certain routes prescribed by the Minister of Communications and Transport (Article 61, of the Law on Land Road Traffic)</td>
</tr>
<tr>
<td>Singapore</td>
<td>Bus service is provided to any person upon the payment of a fare using one or more buses operating on pre-determined timetables and routes. (Chapter I, PTC Act)</td>
</tr>
<tr>
<td>Tokyo</td>
<td>Fixed scheduled operation means operation with fixed route and scheduled time at origin, destination or bus stops in a route. Fixed unscheduled operation means operation with fixed route and unscheduled time at origin, destination or bus stops in a route. Area operation share-ride transportation with demand of passengers. (A public announcement by Tokyo District Transport Bureau, 1-1)</td>
</tr>
<tr>
<td>Yangon</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 2 Statutory regulation on license to operate bus services in the five cities

<table>
<thead>
<tr>
<th>City</th>
<th>Bangkok</th>
<th>Hanoi</th>
<th>Singapore</th>
<th>Tokyo</th>
<th>Yangon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of license(s)</td>
<td>Fixed route license</td>
<td>Non-fixed license</td>
<td>Transport by small vehicles</td>
<td>Competitive tendering</td>
<td>Bus service license</td>
</tr>
<tr>
<td>Validity Period</td>
<td>Seven years (Sec.28, Land Transport Act)</td>
<td>Five years (Sec.28, Land Transport Act)</td>
<td>Five years (Sec.28, Land Transport Act)</td>
<td>N/A</td>
<td>Five years (Article 12, PTC Act)</td>
</tr>
<tr>
<td>Authority to grant a license</td>
<td>By registrar (Sec.23)</td>
<td>By registrar (Sec.23)</td>
<td>By registrar (Sec.23)</td>
<td>N/A</td>
<td>PTC</td>
</tr>
<tr>
<td>Monitoring / regulating authority</td>
<td>BMTA</td>
<td>TRAMOC</td>
<td>PTC</td>
<td>PTC</td>
<td>MLIT</td>
</tr>
<tr>
<td>Matters to be considered to grant a license</td>
<td>N/A</td>
<td>It is necessary to use the motor vehicles with the capacity of over seventeen seats in order to apply for bidding a bus route service in Hanoi. (Article 7, Decree No:110/2006/ND-CP)</td>
<td>(a) Financial standing and applicant ability (b) Route suitability (c) Existing supply (d) Desirability for the public (e) Passenger demand (Article 14, PTC Act)</td>
<td>(a) Financial standing (b) The ability of the applicant (c) The existence of other bus services; (d) The demand for bus services; (e) Any other matter which the Council thinks relevant. (Article 17 PTC Act)</td>
<td>*There are additional eight conditions of bus service license (Article 15, PTC Act)</td>
</tr>
</tbody>
</table>

*No person shall operate 10 or more bus services without this license.

(For Tokyo) Only vehicle inspection. Transport Planning Department shall inform Road Transport Administration Department to inspect the vehicles suitability for operation. (Document from DRT)
### Table 3 Statutory regulation on fare in the five cities

<table>
<thead>
<tr>
<th>City</th>
<th>Bangkok</th>
<th>Hanoi</th>
<th>Singapore</th>
<th>Tokyo</th>
<th>Yangon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Determined by</strong></td>
<td>The Central Land Transport Control Board (Article 19, 1979 Land Transport Act)</td>
<td>N/A</td>
<td>(1) An application for the Council’s approval of any bus, taxi or rapid transit system fare shall (a) be made in such form and manner as the Council may determine; and (b) be supported by such documents (including certified copies of any balance-sheet and profit and loss account, and any auditor’s report, relating to the applicant’s undertaking) as the Council may require. (2) In considering any application for approval of any bus, taxi or rapid transit system fare, the Council shall take into account (a) the need for the applicant to remain financially viable; and (b) the need for public interest to be safeguarded. (Article 24, PTC Act)</td>
<td>Ministry of Land, Infrastructure, Transport and Tourism</td>
<td>Vehicle hiring charges, passenger fares and freight charges of the hired vehicles shall be determined by: (a) The Road and Inland Waters Transport (RIWT) Organizations of the State and Divisions concerned for the rates of transport within each State and Division; (b) Co-ordination of the RIWT Organization for the rates of transport from State and Division to another; (c) The rates of public or state owned hired motor vehicle shall be fixed by organization concerned with the approval of the RIWT Organization. (Article 108, Motor Vehicle Rule)</td>
</tr>
<tr>
<td><strong>Regulation on the fare price</strong></td>
<td>The CLTCB fix the rates of transport charge and other service charges in the transport; (Article 19-6, Land Transport Act)</td>
<td>By Trip Ticket - Flat rate applicable to route(s) with distance of less than 25km in metropolitan area (inner city): 3000 VND/ticket, from 25 km to less than 30km: 4000 VND/ticket, 30km and longer: 5000VND</td>
<td>No person shall be entitled to demand and take fare in excess of that approved by the Council. (PTC 23-(1), PTC Act) Subsection (1) shall not prevent any person from demanding or taking a lower fare than that approved by the Council. (Article 23 - (2), PTC Act)</td>
<td>General share-ride passenger vehicle transport operator shall determine the fare under the approved maximum fare and shall notify to the Minister. This process is the same in the case of change the fare. (Article 9-3, Road Transport Law)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Fare calculation</strong></td>
<td>N/A</td>
<td>Maximum Fare Adjustment for any year (X) = Price Index for Year (X)-0.3% where Price Index = 0.5 CPI + 0.5 WI* (Third Schedule, PTC Act)</td>
<td>Person who manages general share-ride passenger vehicle operation shall decide the maximum passenger fare and shall be approved by minister of Ministry of Land, Infrastructure, Transport and Tourism. The minister shall examine whether the fare is not excess the amount added adequate cost and adequate profit. (Article 9-2, Road Transport Law)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Note: CPI is the change in Consumer Price Index between year (X-1) and year (X-2) and WI is the change in Average Monthly Earnings (Overall Average by Industry) between year (X-1) and year (X-2), adjusted to account for any change in the employer's Central Provident Fund contribution rate as specified in the Central Provident Fund Act.*
3. COMPARATIVE ANALYSIS OF URBAN BUS SERVICES IN THE FIVE CITIES

3.1. Regulation on Vehicle Size and Fare

First, the definition of the minimum number of seats in a bus varies among the cities as shown in the Table 4. The variation of bus capacity may reflect the characteristics or roles of each urban public transportation market in the five cities. Para-transit is usually defined as unscheduled public transportation services which typically utilize minibuses and smaller vehicles. For example, the small capacity buses such as the small truck bus and the Songthaews are widely operated in Bangkok as a middle-sized feeder transportation to access terminal stations of main bus routes. Some of them are able to run only the limited area under regulations. On the other hand, no middle-sized public transportation is operated to access terminal stations in Hanoi with widely used individual motor vehicles to access the stations in the city. Yangon does not have any formal definition of the minimum number of seats; then various types of bus transportation including truck buses, mini-buses are operated. In Tokyo, the small sized vehicles are being utilized after the abolishment of the regulation on the seat.

<table>
<thead>
<tr>
<th>City</th>
<th>Minimum number of seats in a public bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok</td>
<td>7</td>
</tr>
<tr>
<td>Hanoi</td>
<td>17</td>
</tr>
<tr>
<td>Singapore</td>
<td>9</td>
</tr>
<tr>
<td>Tokyo</td>
<td>(11)*</td>
</tr>
<tr>
<td>Yangon</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Note: Currently, the regulation on the minimum number of seat does not exist in Tokyo.

Second, the fare regulation system also varies among the cities as summarized in Table 5. They may be categorized into two types: governmental decisions and rule-based price regulations. The former type is determined in a closed decision-making process which is applied in Hanoi, Yangon and Bangkok. The latter is explicitly formulated in the related laws/acts which are applied in Singapore and Tokyo.

<table>
<thead>
<tr>
<th>City</th>
<th>Type</th>
<th>Fare Regulation</th>
<th>Fare Determination Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok</td>
<td>Governmental decision</td>
<td>Decision by the nation and municipality</td>
<td>Closed discussion by national or municipal government</td>
</tr>
<tr>
<td>Hanoi</td>
<td>Governmental decision</td>
<td>Fare calculation is based on civil income average</td>
<td>Discussion by HPC</td>
</tr>
</tbody>
</table>
| Singapore | Rule-based price regulation | Price Cap Regulation  
The maximum price is adjusted by CPI and WP every year | Application by operators only under the maximum price             |
| Tokyo  | Rule-based price regulation | Price Cap Regulation  
The maximum price is determined on the basis of multi-cost estimations | Application by operators only under the maximum price             |
| Yangon | Governmental decision | Decision by municipality                                             | Closed-discussion by local government                            |

Third, Table 6 shows the minimum fares divided by GDP per capita in the five cities. This indicates that bus fare in Hanoi and Yangon are relatively higher, and that Singapore is the lowest compared among the cities. Singapore, Bangkok, and Yangon supply the “premium bus services” with air-conditioned vehicles or individual seats at a higher price in addition to the regular services. As the urban bus market is monopolistic or oligopolistic in Bangkok and...
Singapore, the bus operators cross-subsidize the regular services with the revenue from the premium bus services.

Table 6 Comparison of minimum fare/GDP per capita among the five cities

<table>
<thead>
<tr>
<th>City and type of bus</th>
<th>GDP per capita (US$) in 2008</th>
<th>Minimum fare per trip for an adult *3</th>
<th>Fare/GDP per capita (1/100000) *4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok (Regular)</td>
<td>7,469 *1</td>
<td>BHT 7</td>
<td>2.5</td>
</tr>
<tr>
<td>Bangkok (Premium)</td>
<td></td>
<td>BHT 12</td>
<td>4.2</td>
</tr>
<tr>
<td>Hanoi</td>
<td>2,574 *1</td>
<td>VND 3,000</td>
<td>7.3</td>
</tr>
<tr>
<td>Singapore (Regular)</td>
<td>45,553.2 *1</td>
<td>SD 66</td>
<td>0.9</td>
</tr>
<tr>
<td>Singapore (Premium)</td>
<td></td>
<td>SD 130</td>
<td>1.8</td>
</tr>
<tr>
<td>Tokyo</td>
<td>31,464 *1</td>
<td>JPY 160</td>
<td>4.4</td>
</tr>
<tr>
<td>Yangon (Regulation)</td>
<td>578 *2</td>
<td>KT 50</td>
<td>7.7</td>
</tr>
<tr>
<td>Yangon (Premium)</td>
<td></td>
<td>KT 300</td>
<td>46.3</td>
</tr>
</tbody>
</table>

Notes:
*1 PPP constant 2005 international $ in 2008, World Bank statistics
*2 Current prices in US dollars in 2008 UN data (2008),
*3 as of December 2008
*4 Exchange rate, national currency per US$ is 1$= BHT 36.88, VND15994.3, SD1.58, JPY116.29, (Source: period average (IMF), UN data 2006) and 1$ = 1122KT (Today in Myanmar, http://www.myanmar2day.com/, as of July 2009)

3.2. Regulation on Public and/or Private Management

Table 7 shows the permission systems and competition types in the five cities from the perspective of regulation. The permission systems are categorized into the three types: tendering system, licensing system, and approval system. The tendering system is defined as the system in which the government or regulator sets the operating conditions including routes and schedules and decides the operator through the bidding; the licensing system is defined as the system in which the government gives a license to operators which satisfy their requirements considering the existing market under demand-supply control; and the approval system is defined as the system in which the government approves operator’s applications without demand-supply control. The competition types are also categorized into the two subgroups: the competition for the market through tendering or licensing systems and the competition in the market under the free entry to or withdraw from the operation. In Bangkok and Hanoi, the operation entity develops an operation plan, suggests a new route if necessary, and determines the level of bus service. Private operators can operate their bidding for the proposed routes in Hanoi whereas the private operators provide the service under a joint-service commission that satisfies the required level of service in Bangkok. In Singapore, the private operators can propose the new routes where the two bus operators control a duopolistic market there since their operation areas are independently allocated by the government at the northern part and southern part of the city. Yangon and Tokyo have adopted the permission system where the private operators compete in the bus market. They are allowed to apply for new route permissions freely as well as being able to withdraw the service from existing routes.

The responsibilities of public and private sectors in urban bus operation also vary among the five cities. Table 8 shows the actors who are in charge of directions, management, and implementation in the five cities respectively. The actors include the national/local government, operational entity, and private company. The responsibilities of public and private sectors are categorized into the four types: private-commissioned management, independent management by a public agency, concession, and private-based operation.
<table>
<thead>
<tr>
<th>City</th>
<th>Permission system</th>
<th>Permission for</th>
<th>Route Planning</th>
<th>Competition Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok</td>
<td>Licensing system (Independent management by a public agency)</td>
<td>Each operation</td>
<td>By BMTA</td>
<td>For the market</td>
</tr>
<tr>
<td>Hanoi</td>
<td>Tendering System (Commissioned operation to private companies through tendering)</td>
<td>Each route</td>
<td>By TRAMOC</td>
<td>For the market</td>
</tr>
<tr>
<td>Singapore</td>
<td>Licensing system (Concession only for two companies with more than 10 routes (Franchise))</td>
<td>Each operation</td>
<td>By operators</td>
<td>For the market</td>
</tr>
<tr>
<td>Tokyo</td>
<td>Approval system</td>
<td>Each route</td>
<td>By operators</td>
<td>In the market</td>
</tr>
<tr>
<td>Yangon</td>
<td>Approval system</td>
<td>Each route</td>
<td>By operators</td>
<td>In the market</td>
</tr>
</tbody>
</table>

Table 7 Permission systems of urban bus operation in the five cities

<table>
<thead>
<tr>
<th>Cities</th>
<th>Regulation</th>
<th>Licensing</th>
<th>Management assistance</th>
<th>Supervision of operation</th>
<th>Route planning</th>
<th>Schedule planning</th>
<th>Fare reception</th>
<th>Investment planning</th>
<th>Vehicle holding</th>
<th>Driving control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok</td>
<td>A</td>
<td>A</td>
<td>A*</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B, C</td>
<td>B, C</td>
</tr>
<tr>
<td>Hanoi</td>
<td>A</td>
<td>A</td>
<td>A*</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Singapore</td>
<td>A</td>
<td>A</td>
<td>A*</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Tokyo</td>
<td>A</td>
<td>A</td>
<td>A*</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Yangon</td>
<td>A</td>
<td>A</td>
<td>A*</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>

Table 8 Responsibilities of related actors in direction, management, and implementation of bus service in the five cities

Note 1: “A” shows the national or local government, “B” shows the operational entity, and “C” shows private companies.

Note 2: “*” means the PTC, which is not governmental but a council, regulates licenses and assists bus management in Singapore.

The institutional system of bus service in Hanoi is categorized into the private-commissioned management. The bus service in this system is directed and managed by government or a public sector. The private companies are designated through the tendering process and they get the permission for the operation under gross-cost-contract. Bangkok bus system operated by the BMTA is categorized into the independent management by a public agency. As a part of the operation is implemented by private operators as a joint-service, this is partly the private-commissioned management. In Singapore, the PTC supervises and monitors bus...
operation while bus operators determine the route plans and manage the operation and investment. This system is categorized into the concession. The concession means that the authority gives operational right to private companies including procurement, financing, or business implementation. This system allows the public sector to keep the right to decide the fare or other management issues. Finally, the bus systems in Tokyo and Yangon are categorized into the private-based operation. Although the BCCs manage bus operation in Yangon, they are not the governmental organization but the committees that consist of local bus operators in Yangon. In Tokyo, the bus service market was deregulated in 2002. The deregulation simplified or reduced the government’s regulations and controls that constrain the bus operations of mainly private companies.

3.3. Market Intervention
To what extent the authorities should intervene in the bus service market is one of the most difficult issues in designing the institutional system. In this paper, we assume that the level of market intervention can be evaluated with the fare-setting system and the operational regulation. Table 9 shows that the institutional systems in the five cities are categorized by types of fare-setting system and by operational regulations. First, there are the two categories in fare-setting system: the government decision and the rule-based price regulation. The government decision means that the government is allowed to determine the fare in accordance with the changes in the market while the rule-based price regulation means that the fare is determined under the operator’s competitions on the basis of the given formula and/or rule. It is expected that the government decision has stronger intervention than price capping. Next, there are the three categories in management regulations shown in Table 9: public management system, public supervision system, and private management system. It is assumed that the public supervision system allows the government to intervene in the market by controlling supply and sometimes by encouraging the establishment of the monopolistic or oligopolistic market. It is also assumed that the public management system has stronger intervention in the market than the other systems because the level of service in routing and scheduling is determined by the government.

Next, we propose an index relating to the market intervention of the government in the urban bus market. The Index of Market Intervention for Urban Bus (IMIUB) is defined as a combination of the score of the market intervention with respect to the fare-setting system (X) with the score of the market intervention with respect to the management regulations (Y). It is assumed that X is equal to 1 if a city has price capping and X is equal to 2 if a city has the government decision system for fare setting. It is also assumed that Y is equal to 1 if a city has the public management system, Y is equal to 2 if a city has the public supervision system, and Y is equal to 3 if a city has the private management system. The IMIUB is assumed to be X + Y. The estimated IMIUB in the five cities are shown in Table 9. They indicate that the degree of market intervention is the highest in Bangkok and Hanoi (the score is 5), and followed by Yangon (the score is 4), Singapore (the score is 3), and Tokyo (the score is 2). These show

<table>
<thead>
<tr>
<th>Fare setting regulation</th>
<th>Government decision</th>
<th>Price capping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational regulation system</td>
<td>Bangkok (5), Hanoi (5)</td>
<td>Singapore (3)</td>
</tr>
<tr>
<td>Public management system</td>
<td>Yangon (4)</td>
<td>Tokyo (2)</td>
</tr>
</tbody>
</table>

Note: The values in the parenthesis indicate the IMIUB.
that the government intervenes in the bus market at a lower level in Tokyo whereas the
government intervenes in the bus market at a higher level in Bangkok and Hanoi. These
results may be useful for mapping the characteristics of institutional system among difference
cities particularly from the viewpoints of market intervention in the bus market. The market
intervention should be evaluated in a careful manner. This is because the market intervention
could result in the positive consequences or the negative consequences. Whether they are
positive or negative may be dependent on the market conditions including the operator’s
efficiency, user’s preferences, and local context. Although it is quite sure that the degree of
market intervention could affect the service quality of urban bus in the cities, its mechanism is
not still clear. For example, Table 6 shows that the fares divided by GDP capita are over 7.0
both in Hanoi and in Yangon although Table 9 shows that the IMIUB is the highest in Hanoi
whereas that is the third lowest in Yangon. Thus, further analysis is required to understand the
impacts of market intervention on the level of service by incorporating other factors than the
fare.

4. CONCLUSIONS

This paper presented the current statutory framework and operation systems of the urban bus
transportation services in the four cities in the SEAR and Tokyo, and analyzed the similarities
and differences among the cities. The cities were Bangkok, Hanoi, Singapore, Yangon, and
Tokyo. The results showed that the definition of the minimum number of seats in a bus, the
fare regulation system, the responsibilities of public and private sectors, and the permission
system of urban bus operations vary among the cities. Then, the paper proposed the Index of
Market Intervention for Urban Bus with which the degree of market intervention is evaluated
in a given bus market. The indexes show that government intervenes in the bus market at a
lower level in Yangon and Tokyo whereas the government intervenes in the bus market at a
higher level in Hanoi.

The following recommendations are withdrawn from the results of our analysis. First, the
regulation of bus operation with small-sized vehicles should be differentiated from that with
large-sized buses considering their operational characteristics and safety. As discussed in
section 3.1, such cities as Bangkok and Tokyo are currently trying to utilize the small- and
medium-sized vehicles as the urban public transportation mode, particularly in lower-demand
routes. Although the small- and medium-sized vehicles can provide the flexible service with
lower cost, they tend to provide poorer quality of service due to their unfixed routes and
unscheduled time tables. They also often cause the traffic congestion due to their lower
capacity. For making best use of the small-sized vehicles in public transportation market, it is
recommended to introduce the additional regulations relating the small- and medium-sized
bus vehicles. They may include an operational-area regulation with which the conflict
between small-sized vehicles and large-sized vehicles can be avoided in major routes and a
flexible entry regulation with which the bus operators using small-sized vehicle can start their
service even at low service frequency.

Next, the bus fare should be determined in a transparent decision-making process particularly
in unstable markets. Although the regulation and/or decision-making process regarding bus
fare are not explicitly presented to the public in Bangkok, Hanoi, and Yangon, the fare
divided by GDP capita is over 7.0 in Hanoi and Yangon whereas that is 2.5 in Bangkok. This
is probably because the local market is often affected by inflation or gas price fluctuation in
Hanoi or Yangon whereas the local market is quite stable in Bangkok. Thus, it is
recommended that the authority monitors the bus fare regularly and adjusts it appropriately on the basis of formal fare setting process.

Finally, the private management under the well-organized control of government should be more elaborated in the urban bus market. This paper found out the three facts: lower cost-efficiency in the independent management of the public agency, lower service level in the management of the private operators, and increase of withdrawal from unprofitable routes after the privatization of bus service. It is recommended that the balanced management between the authority and private operator should be introduced into bus operation. This means that too high or too low IMIUB may not be suitable for the sustainable bus transportation market. The privatization of bus service may be required when the IMIUB is too high while the public control should be possibly strengthened when the IMIUB is too low.

The further research issues are summarized as follows: first, this paper includes only the five cities in the SEAR and Japan. Other cities in Asia should be included in the comparative analysis to extend the local knowledge and experiences pertaining to the urban bus systems in Asia. The policy implications for the bus market in Asia could be further discussed by comparing the bus systems in Asia with those in other regions including Europe, North and Latin America, and Africa. The comprehensive database relating to the urban bus system could be useful for transportation planners, policy makers, bus regulators, and even private investors. Second, many local cities have no law/act translated into English or have limited laws/acts written in English. Thus, all related legal documents may not be covered by this paper even in the five cities. To enrich the database of the statutory system in Asia, it may be necessary to work jointly with local researchers in each country. Third, although the IMIUB was proposed, it was not analyzed in detail because of the lack of empirical data of bus market. The demand of urban bus markets and the cost structure of the urban bus industry should be further collected to analyze the impacts of IIMIUB on the bus market. Finally, the mechanism analysis of institutional systems could be explored empirically with the collected data. This includes the institutional economics approach (Aoki, 2001) in which the game theory is typically applied to the dynamism of institutional systems. This is also particularly interesting in the Asian context because it is expected that the Asia-specific factors including the climate, the culture and socio-demographic conditions may result in the unique mechanism of institutional dynamics in Asia.

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