Vision and Strategies of Public Transportation in ASEAN Megacities

Changhwan MO,
Young-in KWON, and Sangjun PARK

THE KOREA TRANSPORT INSTITUTE
ASSOCIATION OF SOUTHEAST ASIAN NATIONS
Ministry of Foregin Affairs
Republic of Korea

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The Korea Transport Institute (KOTI)

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Preface

Low carbon and green growth are the key issues facing urban development today, and the growing number of private vehicles, in parallel with economic growth in the ASEAN region, is a critical problem for environmental sustainability. This ASEAN-Korea project addresses urban transport issues with the objective of promoting public transport in the urban areas of ASEAN countries by directly finding out the problems of urban public transport in ASEAN cities, consulting with ASEAN transport officials about sustainable strategies for it at two workshops and with published reports, and transferring Korean public transport experiences and technologies to ASEAN countries so that they can build up human-oriented and sustainable transport systems.

Through on-site visits, surveys, interviews and the two workshops in the ASEAN region, this consulting project aims to establish public transport strategies for ASEAN megacities, because the improvement of public transport lowers air pollution and traffic congestion. Its main objective is to contribute to greenhouse gas reduction and low-carbon green growth by transferring Korea's policy experience in public transportation to ASEAN member countries. It is also expected that this project will promote cooperative relationships between Korea and the ASEAN region by expanding the scope and depth of cooperation.

We are living in a global age where no one country can survive alone, where every country is interdependent. This report will provide a precious opportunity for public officials and experts in ASEAN countries to share problems, experiences, and solutions regarding public transport. In the process of rebuilding the Korean economy after the Korean War, the nation received a great deal of overseas support in the form of consulting, education and financing. In the same manner, the Korean government is willing to share its experiences with ASEAN member countries in the form of global cooperation. This ASEAN-Korea project symbolizes such an effort.

We will share our knowledge of public transport with ASEAN member countries through this book. I sincerely hope this kind of effort will contribute significantly to improving the condition of public transport in ASEAN countries.

Chang Woon LEE
President
The Korea Transport Institute

CHAPTER

1

Introduction

Changhwan MO

The population increase in the ASEAN region has caused rapid urbanization, and the fast increase in private vehicle ownership in line with economic growth is the cause of such concerns as air pollution and traffic congestion. But most ASEAN countries do not strategically respond to these challenges of urban transport, and the lack of public transport services causes a serious barrier for economic development and sustainable growth. Therefore, it is necessary to transfer Korea's transport technologies and policy experiences in public transport to the ASEAN countries.

The title of the project is the "Development of Public Transport Strategy for Low Carbon and Green Growth." The time schedule for the project is from October 1, 2103, to October 31, 2014. Its goal is to establish an environmentally friendly public transport system that is based on green technologies and sustainability. This study is also planning to formulate transport policies for urban areas. The potential beneficiaries of this project are assumed to be all citizens of ASEAN member nations, government policy makers in the ASEAN region, and the transport industry for ASEAN investment.

Among ASEAN member countries, Myanmar, Lao PDR, Cambodia, Thailand, the Philippines, and Indonesia are similar to Korea in the 1970s~80s with respect to the pattern of economic transition and level of transport policies. Therefore, the demand for transferring Korea's transport policy experience to the ASEAN countries is probably high since the Korean experience is relatively recent in comparison to other developed countries, such as European countries, Japan or North American countries, and they are more relevant to most ASEAN countries.

As most ASEAN countries require the systematic development of public transportation, KOTI can provide expert consultation to the public officials and experts of these countries on a sustainable strategy for public transport.

The network of public transport officials of ASEAN member countries that the KOTI built up at the capacity building program in 2012 is a valuable asset in the course of establishing public transport strategies in the ASEAN region.

Korea's transport policy has significantly contributed to the last 40 years of economic development. Moreover, Korea has managed to maintain a sustainable transport policy and is recognized by the World Bank as an exemplary model case. And these cooperative projects between ASEAN and Korea are part of our intention to share knowledge and experiences with the ASEAN countries that are undergoing a similar economic transition period. From a more global perspective, low carbon and green growth is a policy effort on a worldwide scale, and should bring significant contributions to the global effort to reduce vehicle emissions and promote green technologies.

This report will provide a precious opportunity for all ASEAN public transport experts and public officials to share the problems of urban transport and to discuss possible solutions for them in their countries. Since each country is undergoing different stages of transport development, the discussions in this book are intended to identify areas of focus to improve urban transport from the view of low carbon and green growth.

At a meeting of the ASEAN-Korea capacity building program in 2012, ASEAN transport officials participated in group discussions in the areas of public transport, transport safety and transport planning in ASEAN countries. The discussion on public transport provided useful initial findings for necessary strategies on public transportation in ASEAN countries. The items identified to be addressed by ASEAN governments are as follows: Funding (PPP, value capture), transit-oriented planning and development, land-use and transport planning, public transport networks and systems, commitment and leadership, technology, education and knowledge, sharing best practices, marketing and image of public transport, efficient operations, climate change and the environment, regulations and legislation, availability, accessibility, and integration of public transport, public transport business models, modernization of infrastructure (ITS and electronic ticketing system), and context-oriented solutions.

The results of a survey of transport specialists from the ASEAN ministries of transport in 2012 showed that financial problems, the complexity of project processes, difficulty in securing project continuity, deficiencies in transport technology exchange, insufficient support for establishing sustainable transport systems, and clarity of project processes

were major factors in the development of transport infrastructure and improvement of transport conditions. The demand for Korea's knowledge and experiences in these aspects of transport infrastructure development are judged to be significantly high, primarily due to the similarity in the economic transition patterns of the 1980s in Korea, and due to the fact that Korea's experiences are relatively recent.

The success criteria are the quality of the formulated strategies, their adoptability by the national transport plans of the ASEAN governments, and applicability for the transport industry to implement them. The implementation aspects include advanced transport technologies and policies such as BRT, LRT, subways, trams, traffic management systems, transportation card standardization, and intelligent transport systems.

1. Research Methods

Through on-site visits, surveys, interviews and two workshops in the ASEAN region, this consulting project aims to propose public transport strategies for major ASEAN cities, because the improvement of public transport lowers air pollution and traffic congestion.

The methodology used for this study started from reviewing the literature on previous studies on ASEAN megacities. Then the researchers visited each ASEAN megacity and interviewed public transport experts and public officials. Lastly, they added input from the participants in the two ASEAN-Korea public transport workshops. The first group is Indonesia, Malaysia, Brunei, the Philippines, and Singapore, while the second group is Laos, Myanmar, Vietnam, Thailand, and Cambodia.

The researchers for this consulting project visited each ASEAN megacity, investigated the problems of urban transport, and suggested public transport strategies for these megacities. As an effective tool to develop public transport strategies in ASEAN megacities, this project had two public transport workshops.

To find out strategies for ASEAN megacities, two workshops were held in these megacities. The first ASEAN-Korea public transport workshop was held in Manila, the Philippines in March 2014, and participants who came from four megacities in ASEAN countries, Indonesia, Malaysia, Singapore, and the Philippines, discussed the key problems of urban transportation that ASEAN megacities were facing. The workshop program was an opportunity for all participants to present the case studies of their

Table 1.1 List of participants at the first ASEAN-Korea public transport workshop in 2014

	Name	Country	Office	Position
1	Alvinsyah Muslihun	Indonesia	University of Indonesia	Department of Civil Engineering
2	Surya Raj Acharya	Nepal	ITPS	Research Advisor, Course Coordinator, General Secretary
3	Tonny Agus Setiono	Indonesia	Ministry of transportation, Republic of Indonesia	Urban Transport Development
4	Izzah Binti Paku Rozi	Malaysia	SPAD (Land Public Transport Commission), Federal Government of Malaysia	Policy, Planning & Research
5	Anthony T. H. Chin	Singapore	National University of Singapore	Professor, Dept. of Economics, Center for Transportation Research
6	George Sun	Singapore	LTA (Land Transport Authority), Singapore government	Deputy Director, Research & Publications
7	Kijun Kim	Korea	Asian Development Bank	Transport Specialist
8	Cris Diaz	Philippine	University of Philippines	Professor
9	Robert Siy	Philippine	Ministry of Transportation and Communications	Senior Advisor
10	Gyeng Chul KIM	Korea	Korea Transport Institute, Republic of Korea	President
11	Changhwan MO	Korea	Korea Transport Institute , Republic of Korea	Director
12	Young-in KWON	Korea	Korea Transport Institute, Republic of Korea	Research Fellow
13	Sangjun PARK	Korea	Korea Transport Institute, Republic of Korea	Associate Research Fellow
14	Dae Yup LEE	Korea	Korea Transport Institute, Republic of Korea	Researcher
15	Byung Hyeop KIM	Korea	Korea Transport Institute, Republic of Korea	Intern

countries. Each country is undergoing different stages of development, and the discussion was intended to identify areas of potential infrastructure investment and the criteria for policy planning suitable for different countries.

The second ASEAN-Korea public transport workshop was held in Jakarta, Indonesia in August 2014. The workshop participants, who came from six megacities in ASEAN countries, such as Indonesia, Cambodia, Vietnam, Laos, Thailand and Myanmar, communicated key problems of urban transportation that ASEAN megacities were facing. Each city has different problems by its economic growth stage. But ASEAN cities have common

Figure 1.1 *1st ASEAN-Korea public transport workshop in 2014*

problems. First, due to the increase of personal income, citizens can afford to purchase private cars for their mobility needs, and the cities are experiencing a rapid increase in cars, which is producing traffic congestion on the streets. Second, most cities respond to the increase in automobiles by focusing on a road-oriented transport policy. As a result, pedestrian facilities and public systems are not properly invested in to meet the mobility needs of ordinary citizens. Third, the car-dominant cities have air pollution and environmental problems.

To counter this vicious cycle, the government should invest in public transport systems. The problem with this is the difficulty in gaining

Figure 1.2 *2nd ASEAN-Korea public transport workshop in 2014*

political support for public transport investments, because a car-oriented society does not invest in public transport. At the workshop, the following public transport strategies were discussed to reverse the vicious cycle of urban transportation in ASEAN megacities: Creation of special accounts for transportation, creation of national think tanks and public transport agencies, utilization of value capture, utilization of PPP, transit-oriented development (TOD), improvement of the pedestrian environment, utilization of technology, integration of public transport systems, introduction of BRT systems, improvement of bus systems, and utilization of electricity buses and trams.

Table 1.2 List of participants at the Second ASEAN-Korea public transport workshop in 2014

	Name	Country	Position and office
1	Dinh Van Hiep	Vietnam	Assist. Prof., Vietnam National University of Civil Engineering
2	Truong Hoang Hai	Vietnam	Manager, Hanoi Transport Management and Operation Center
3	Nguyen Viet Phuong	Vietnam	Assist. Prof., Vietnam National University of Civil Engineering
4	Do Minh Trung	Vietnam	The Department of Traffic Safety of Ministry of Transport, Vietnam
5	Surachet Pravinvongvuth	Thailand	Assistant Professor, Asian Institute of Technology
6	Padet Praditphet	Thailand	Acting Director, Ministry of Transport
7	Anchalee Jenpanitsub	Thailand	Acting Director, Mass Transit Authority of Thailand (MRTA)
8	Bounta Onnavong	Laos	Director, Ministry of Public Work and Transport
9	Phongsavanh Inthavongsa	Laos	Lecturer, Faculty of Civil Engineering, National University
10	Pheng Pharinet	Cambodia	Officer, Department of Public Works and Transport
11	Sinara Hong	Cambodia	Deputy Director, Public Work of Ministry in Phnom Penh
12	Kyaw Lat	Myanmar	Advisor, Yangon City Development Committee
13	Alvinsyah Muslihun	Indonesia	Professor, University of Indonesia
14	Joonho KO	Korea	Center Director, Global Cities Research Center, the Seoul Institute
15	Junghyung SUH	Korea	Global Director, Global Business Division, Korea Smart Card
16	Chandhwan MO	Korea	Director, the Korea Transport Institute
17	Young-in KWON	Korea	Senior Research Fellow, the Korea Transport Institute
18	SangJun PARK	Korea	Associate Research Fellow, the Korea Transport Institute

2. Goals

Low carbon and green growth are the key issues facing urban development today, and the growing number of private vehicles, in parallel with economic growth in the ASEAN region, is a critical problem for environmental sustainability. This project addresses urban transport issues with the objective of promoting public transport in the urban areas of ASEAN countries by directly investigating the problems of urban public transport in ASEAN cities, consulting with ASEAN transport officials about sustainable strategies for it in two workshops and with a published report in English, and transferring Korean public transport experience

and technologies to ASEAN countries so that they can build up human-oriented and sustainable transport systems.

The main objectives of this study are to contribute to greenhouse gas reduction and low-carbon green growth by transferring Korea's policy experience in public transportation to ASEAN member countries. It is also expected that this project will promote cooperative relationships between Korea and the ASEAN region by expanding the scope and depth of cooperation between the transportation industries of Korea and ASEAN countries.

Another key objectives of this study are to formulate a comprehensive strategic consultation for the sustainable public transport policies of ASEAN countries and to collaborate with public officials and public transport experts as local consultants in ASEAN countries to create visions and strategies for viable and efficient public transport systems.

3. Contribution and Effects

The direct beneficiaries of this study are the policy decision makers and public officials of public transport in ASEAN countries. They will get professional consulting on public transport policy making. In general, the citizens of ASEAN member countries are the ultimate consumers of the development of public transport systems with a long-term perspective of economic growth and sustainability in their own countries. In addition, the transport industries of ASEAN countries will be actively involved in the planning and construction of public transport infrastructure in the future. Overseas transport industries with an intention to start infrastructure investment projects in the ASEAN region are going to be indirect beneficiaries. Two reports on the current status and public transport strategies will be published and shared with ASEAN public officials and experts.

The participants, including the ASEAN government officials and local experts, will be regularly informed about new transport policies through e-mail, advisory meetings, conferences and published materials. When international conferences are held, the transport specialists of the consulted countries will be invited and have the opportunity to present the long- and mid-term prospects of each country's transport policies. The KOTI website will provide guidance and an application system for future master planning cooperation dealing with Korea's development experiences for the ASEAN

ministries of transport and infrastructure. Above all, as all participants of the ASEAN-Korea public transport workshops suggested at the two workshops in Manila and Jakarta, the Korea Transport Institute is trying to have the ASEAN-Korea public transport workshop every year.

CHAPTER

2

Problems

Changhwan MO

Each country in the ASEAN region has different transport problems by economic growth stage. For example, the main urban transport problems of Jakarta are the rapid increase of private cars, increasing ownership and usage of motorcycles, traffic congestion, air pollution, road-oriented transport policy, lack of funding for public transport, low levels of public transport services, and lack of transport services for the transport disadvantaged, such as the poor and the disabled. However, the different problems of ASEAN countries can be classified into three types: common, policy and implementation. It is easy to be misled by phenomena, but I would rather focus on those hidden or structural problems behind the phenomena. It is always important to see the hidden things that lie underneath the surface.

Some people argue that the climate and environment of ASEAN countries is not conducive to public transportation. This is simply not true, because Singapore has been very successful in providing public transit services for its citizens, and public transit has become an essential part of life for Singaporeans. Another example is Korea. During the summer it is too hot or there is too much rain to walk, but commuters keep using public transit, and during the winter, although it is too cold and windy to stand waiting for buses or walk to subway stations, Korean people use public transit as usual.

First, ASEAN countries have common problems with respect to urban transportation, such as urbanization and motorization, traffic congestion, and air pollution. These problems should be solved by the development of public transport systems. Due to the increase in personal income by economic growth, citizens can afford to purchase private cars or motorcycles for their mobility needs, and countries in the process of fast urbanization have a rapid increase in cars and motorcycles, which produces

traffic congestion and air pollution on the streets.

Second, ASEAN countries have policy-related problems with respect to urban transportation. These problems are closely related to the development of public transport systems. Most cities in ASEAN countries respond to the increase in automobiles and traffic congestion by focusing on a road-oriented transport policy. As a result, pedestrian facilities and public transport systems are not properly invested in to meet the mobility needs of ordinary citizens who cannot afford to buy a private car. Accordingly, many who cannot afford to purchase a private car buy motorcycles. The policy-related problems are as follows: A car-oriented transport policy, deficiency in pedestrian transport policy, lack of public transport investments, underestimation of the role of buses, lack of understanding of BRT, lack of a sustainable transport policy, lack of utilization of technology, lack of public transit integration, and unbalanced development of public transit.

Third, although ASEAN countries have a lot of public transportation plans to construct MRT and BRT, they have not really constructed and operated these systems for a long time because they have public transportation implementation problems. The implementation problems are as follows: Lack of a public transport financing mechanism, lack of mobilization of private capital, no leading public transport organization, no transport think tank, transport database deficiency, lack of planning capability, lack of utilization of ODAs, and lack of legal foundation for public transportation. The key problem for public transportation is a lack of political support and commitment for public transport investments, because a car-oriented society does not usually put financial resources into public transport systems. ASEAN countries have a lot of public transport plans to construct urban railways and BRT, but they do not have a stable financing mechanism for public transport to fund those plans. More importantly, most of them do not have a leading public transport agency

Table 2.1 Type of urban transport problems in ASEAN countries

Type of problems	Content
Common	Urbanization and motorization, traffic congestion, air pollution
Policy	Car-oriented transport policy, deficiency of pedestrian transport policy, underestimation of the role of buses, lack of utilization of BRT, lack of public transit integration
Implementation	Lack of public transport financing mechanism, lack of mobilization of private capital, no leading public transport organization, no transport think tank, deficiency of transport database, lack of planning capability, lack of utilization of ODAs, lack of legal foundation

to make effective plans for public transport projects and coordinate various stakeholders to smoothly implement public transport policies. In addition, those countries do not have a transport think tank that designs public transport policies, plans public transport projects and continuously supports their implementation.

1. Common Problems of ASEAN Megacities

There are four major issues that ASEAN megacities, such as Manila and Jakarta, are facing in the transport sector: urbanization and motorization, traffic congestion, air pollution, and a low level of service by public transportation. The combination and interrelated nature of these issues has hindered the development of ASEAN megacities.

1.1 Urbanization and Motorization

In ASEAN countries, the GDPs per capita are US$43,116 for Singapore, US$29,674 for Brunei Darussalam, and US$8,423 for Malaysia. Those of the other countries are under US$5,000, with relatively poor transport infrastructure and low capability of transport policy making. However, since the ownership of private vehicles and motorbikes is increasing in most of the ASEAN region, the development and promotion of efficient public transport systems is of paramount importance to long-term environmental consequences and urban sustainability.

The vehicle ownership in ASEAN was 26 vehicles per 1,000 people in 2000, which was much lower than the world average of 104 vehicles per 1,000 people. However, in 2010, ownership had sharply risen to 40 vehicles per 1,000 people, which is a staggering 53.8% increase, and is expected to continue to increase rapidly. This increase is an alarming statistic, and without viable and efficient public transport systems, the region's environmental problems due to rapid urbanization will get worse on a large scale.

There are also many motorcycles running on the streets compared with automobiles in several ASEAN megacities such as Hanoi, Phnom Penh and Jakarta. In Hanoi and Phnom Penh, more motorcycles than cars are running. In Jakarta, "the number of motor vehicles in Greater Jakarta is growing rapidly, up to 11% per annum, and this motorcycle boom phenomenon slows traffic to a crawl and proves to be dangerous." (Setiono,

2014, p.199).[1] The modal share of motorcycles has rapidly increased, from 21.2% to 48.7% in 2010, while that of buses saw a huge drop from 38.3% in 2002 to 12.9% in 2010 (Setiono, 2014, p.199). In the case of cars, the modal share increased slightly from11.6% in 2002 to 13.5% in 2010.

Table 2.2 Automobiles and motorcycles in Hanoi and Phnom Penh

Classification	Hanoi, Vietnam (2013)	Phnom Penh, Cambodia (2013)
Automobiles (car, trucks, etc.)	380,000	377,660
Motorcycles	3,700,000	1,980,000

Although Singapore has demonstrated how urban transport problems are efficiently managed by introducing appropriate transport policies and can be benchmarked to improve the situation in other ASEAN countries, most ASEAN countries, such as Thailand, the Philippines, Indonesia, Lao PDR, Myanmar, and Viet Nam are in short supply of an urban transport infrastructure and transport policy-making capability. This lack hinders these countries from succeeding in low-carbon green growth.

Urban population growth in ASEAN megacities continues at a very high rate in terms of both internal growth and in-migration. As a result, this growth has spilled over to the towns and cities within a 30- to 50-kilometer radius of the metropolis. For example, it is estimated that the population of Metro Manila and the adjoining provinces will have to accommodate the addition of about two million and six million persons by 2030, respectively. Despite the spillover to the periphery, the population density of ASEAN megacities is quite high. For example, more than half of the 17 LGUs (local government units) showed densities of more than 200 persons/ha. The cities of Manila and Mandaluyong were the most dense, with 650 persons/ha and 350 persons/ha, respectively. At the barangay level, about 50% of the people live in high-density barangays (population density of >300 persons/ha). If this population growth trend continues, Metro Manila's density will increase from 191 persons/ha to 224 persons/ha.

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1 Setiono, Tonny Agus. (2014). "JABODETABEK Public Transportation Policy and Implementation Strategy in the Republic of Indonesia." In *Proceedings of 1st ASEAN-Korea Public Transport Workshop 2014*. Manila, Philippines. Ilsan, Korea: The Korea Transport Institute. pp. 195-212.

1.2 Traffic Congestion

Excessive traffic congestion keeps worsening in ASEAN megacities. Simply put, transport demand exceeds the capacity of road networks, in particular during peak hours. Vehicles cannot move and cause a messy situation everywhere in these megacities, although there is some difference in the degree of traffic congestion.

In Hanoi, "congestion causes traveling time delays, economic losses, air pollution, traffic accidents, culture degradation, disturbances of social activities and leads to a low quality of life." (Hiep, 2014, p.78).[2] The number of vehicle registrations increases every year at a rate of 12 to 13% for motorcycles and 9 to 13% for cars. There is heavy congestion during rush hours in the city centers, and the hectic road status contributes to a high number of traffic accidents.

Traffic congestion is a widespread issue in Metro Manila, caused by traffic from its peripheries as well as from within Metro Manila. Due to the high demand for all modes of transport, including private cars, mass transit, public utility buses, public utility jeepneys, filecabs, tricycles, pedicabs and taxis, the majority of the roads in Metro Manila average 10 kph, and 75% to 92% travel at speeds below 20 kph. As a result, traffic congestion raises the transport cost of road users, including vehicle operating costs and that

Figure 2.1 Traffic congestion in Jakarta

Source: Setiono. (2014).

Figure 2.2 Traffic congestion in Hanoi
Source: Hiep and Hai. (2014)

of time.

Most of the arterial roads in Metro Manila are either operating at, or close to, capacity. Road traffic speeds tend to drop rapidly once the volumes exceed 50% of capacity. The majority of the roads in Metro Manila average 10 kph, and 75% to 92% travel on the network at speeds below 20 kph.

Bangkok also faces the same problem of traffic congestion. In 2013, BBC ranked Bangkok as the worst global megacity in traffic prob;ems. The second worst megacity was Jakarta.

1.3 Air Pollution and GHG Emissions

In addition to the negative impacts on the economic and social aspects,

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2 Hiep, Dinh Van and Hai, Truong Hoang. (2014). "The Current Status, Problems and Green Strategies of Public Transport in Hanoi: Application of Intelligent Transportation Systems (ITS)." In *Proceedings of 2nd ASEAN-Korea Public Transport Workshop 2014*. Jakarta, Indonesia. Ilsan, Korea: The Korea Transpor Institute. pp. 75-103.

congestion greatly impacts the environment, and more specifically, air pollution and GHG emissions. Due to the rapid motorization, the pollution levels in ASEAN megacities are also getting worse. The levels of one of the most dangerous pollutants, microscopic dust known as PM10, in urban areas in Vietnam, Indonesia, Myanmar, and Cambodia is more than four times higher than in Germany and France, according to the World Bank. This is caused by the fast increase in cars and motorbikes as ASEAN megacities achieve greater economic prosperity.

Air pollution in ASEAN countries has been worsened by loose control of vehicle emissions, due to lenient regulations and enforcement on old vehicles, low-quality fuels, and inspection and maintenance. For example, the Philippines National Emission Inventory in 2008 showed that 65% of the total emissions come from mobile sources, followed by stationary sources at 21%, and 14% come from area sources. This points to transport as the principal culprit, which will not change even when more recent data becomes available. Motor vehicles are the dominant source of air pollutants in the urban area. Emissions from mobile sources contribute significantly to total emissions of particulate matter (PM), volatile organic compounds (VOC), carbon monoxide (CO), and nitrogen oxides (NOx). According to the EMB-DENR, the share of mobile sources to the total amount of VOC, CO, NOx, and PM10 in Metro Manila are 95.6%, 99.4%, 89% and 17%,

Figure 2.3 Air pollution in Hanoi
Source: Hiep and Hai. (2014)

Figure 2.4 *Air pollution from bus in Hanoi*
Source: Hiep and Hai. (2014)

respectively. In terms of vehicle class, jeepneys (powered mostly by second-hand diesel engines) and motorcycles and tricycles (MC/TC) are the major sources of PM. Other pollutants from jeepneys, such as NOx and SOx also show a high proportion in the total mobile source emissions.

Under the National Framework Strategy on Climate Change (NFSCC) 2010-2022, low-carbon paths in the transport sector are regarded as a high strategic priority. The transport sector's contribution to GHG emissions has increased significantly both in absolute and relative terms since 1990. The GHG emissions from the transport sector are significantly larger, approximately over 30%, excluding the effect of land-use change. Based on the current motorization growth of about 6%, emission contributions from road transport is projected to increase to 37 and 87 $MtCO_2e$ by 2015 and 2030, respectively, in a business as usual (BAU) scenario. A large part of these GHG emissions would come from Metro Manila's transport sector.

In the global scheme of things, Metro Manila's GHG per capita emission level is relatively small, despite it being the 20th-largest metropolis in terms of population. Its GHG emissions per person is almost the same as Tokyo's, and less than Jakarta (1.6 times more) and Bangkok (5.4 times more).

Congestion has negative impacts on economic, social and environmental aspects and will deter the overall functioning and livability of ASEAN megacities.

1.4 Low Public Transport Service

ASEAN megacities do nor supply public transport services enough to meet the demand of citizens. Absolute lack of public transport services causes extreme crowdness and blocks citizens from using public transit.

Figure 2.5 Low level of bus services in Hanoi
Source: Trung. (2014).

Figure 2.6 Congestion in Jakarta BRT Station

The impact of traffic congestion on public transport is even more severe than that of private cars. Low speed equates to a lower number of trips, higher costs, and lower productivity. For passengers, it means longer travel times and a higher incentive to shift to cars.

In Manila, the average speeds of buses are below 20kph for all time periods. Various estimates of the economic cost of traffic congestion have been made. One study estimated that the economic losses from traffic congestion in the last decade are four times larger than the investments needed for the public transport projects in Metro Manila. In Jakarta, due to low capacity public transport, only around 27 percent of about 24 million trips was carried by public transport and economic losses by traffic congestion reached up to US$1.3 billion in 2010 (Setiono, 2014).

2. Policy Problems of ASEAN Megacities

2.1 Car-Oriented Transport Policy

Severe congestion, poor air quality, increases in road accidents and transport energy consumption are the other side of urbanization problems, especially in developing countries. Most ASEAN countries have a tendency to deal with these problems with stereotyped approaches, largely through supply-oriented approaches such as building more roads and constructing flyovers.

For example, Bangkok and Kuala Lumpur have implemented a car-oriented and road-based transport policy, as there are many elevated roads and pedestrian overpasses on the streets. Pedestrians are not properly protected from automobiles and pedestrian rights

Figure 2.7 Car-Oriented transport system in Bankok

Figure 2.8 Road-Oriented transport system in Kuala Lumpur

have not been secured at crossings and on pedestrian roads. In addition, bus stations are not adequately furnished for the convenient use of bus passengers.

2.2 Unfavorable Environment for Pedestrians

As I mentioned above, if a government in an ASEAN country chooses a car-oriented transport policy, it will not have resources left to provide a favorable pedestrian environment. The ASEAN governments need to improve the pedestrian environment to encourage people to use public transport. If people cannot safely and comfortably walk on pedestrian streets, they are simply not going to use public transit. For example, since Hanoi has a lot of illegal motorcycle parking and barriers on pedestrian roads, pedestrians sometimes have to walk on roads with cars. "Sidewalks are used as parking spaces for motorcycles and the number of them keeps increasing." (Hiep, 2014, p.78) In this walking environment, citizens cannot use public transit easily.

The door-to-door travel times for private vehicles remain competitive against the use of public transport. The main reason for the longer travel time of public transport is poor accessibility to jobs and facilities by public transport systems. The general policy targets for public transport should

Figure 2.9 Illegal parking of motorcycles on pedestrian roads in Hanoi

be to raise the modal share, improve reliability and journey times, enhance comfort and convenience, and improve accessibility and connectivity.

Diaz (2014, p.163) pointed out the problems of the pedestrian environment in Manila: "Pedestrian facilities are not given enough attention, partly perhaps because pedestrians are considered 'less important' than motor vehicles; transport planning needs to shift from the viewpoint of moving vehicles toward the viewpoint of moving people."[3] Diaz (2014, p.163) also pointed out the role of pedestrian facilities in public transport: "Users will pass through these facilities to access public transport, and pass through these facilities from public transport toward their final destination; therefore, good pedestrian facilities can help promote the use of public transport." In Manila, poor pedestrian mobility paths or no proper pedestrian connections from urban railways, narrow sidewalks, poor paving finishes and street utilities are contributing to an uncomfortable pedestrian experience. Diaz (2014, p.167) concluded that "Walking facilities should

3 Diaz, Crispin Emmanuel D. (2014). "Some Ideas for Improving the Public Transport System." In *Proceedings of 1st ASEAN-Korea Public Transport Workshop 2014*. Manila, Philippines. Ilsan, Korea: The Korea Transport Institute. pp. 155-167.

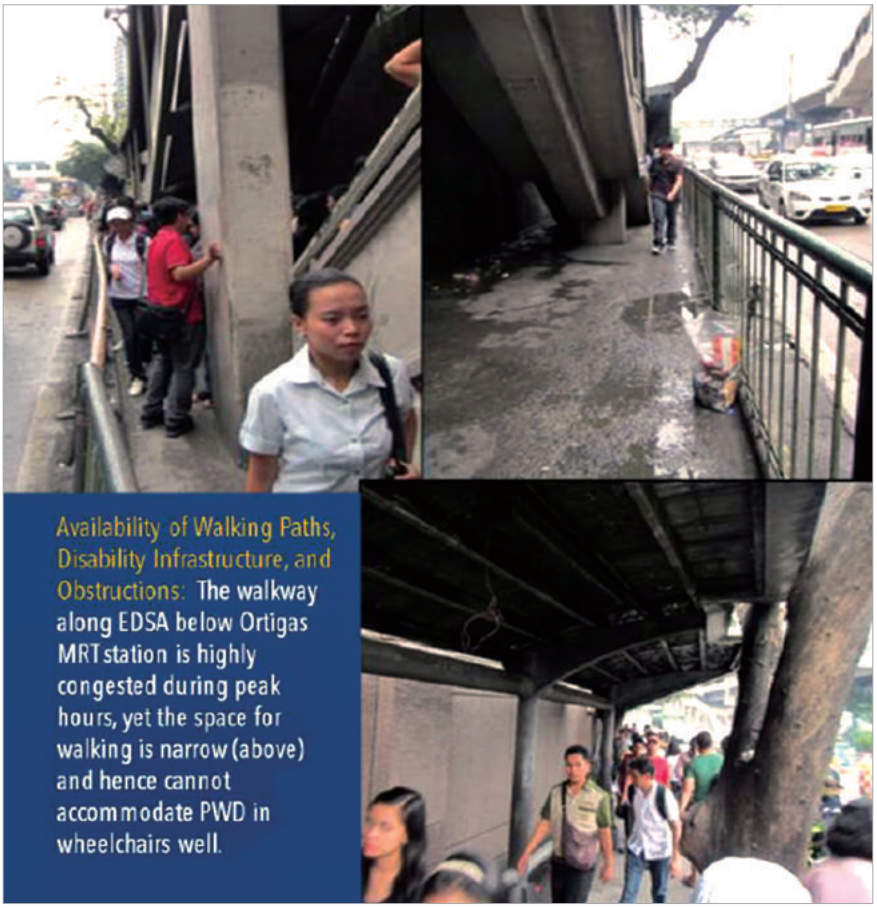

Figure 2.10 *Walking barriers in Manila*
Source: Diaz. (2014).

connect to major and minor public transport stops to further encourage the use of public transport, and pedestrian networks need to be enhanced along with the overall public transport networks and systems."

2.3 Underestimation of the Role of Buses

The bus services in ASEAN megacities have problems such as a low level of services in terms of on-time performance, frequency, reliability and cleanness, lack of integrated or comprehensive bus planning, unpublished timetables, uncoordinated services, outdated bus vehicles, poor bus stop

facilities and a distinct lack of enforcement of operating rules. The bus services are significantly failing to meet the needs of citizens in ASEAN megacities. Most risks affecting revenue and costs are out of the operator's control, and operators survive by cutting costs and quality without any incentive to invest in new buses or services.

The general features of road-oriented transport systems in ASEAN megacities are insufficient bus priority measures across the bus network to protect them from congestion on the road. Low levels of public transport services are also noted as a problem needing corrective action, especially for buses. The bus services were at a low level in frequency, on-time performance, cleanness, comfort, and air conditioning. These problems are due to the low quality of bus vehicles by aging and inadequate maintenance, road-oriented transport policies, and lack of funding for public transport.

ASEAN megacities show similar problems to Seoul, Korea where the traffic congestion of buses was extremely serious, since private buses were the primary transport mode during the 1960s-70s. Due to the over congestion of buses, there was a hustle and bustle to get off buses, and passengers even get off buses in the third lane. The disruption of traffic flows was a major problem in the city.

The existing bus network services mainly focus on central areas and are concentrated on the main corridors. Therefore, there is sometimes a

Figure 2.11 Buses in Yangon

congestion of buses and severe competition between operators due to a lack of coordination or regulation. There are not many services connecting from the residential areas to the city center, and the level of accessibility to bus stops, which is confined as the walking distance of a bus service, is low. The majority of residential areas in ASEAN megacities are not connected to a bus service network.

Bangkok does not have a hierarchical harmony in its public transport system since it mixes old and modern transport modes. Motorcycles and tuk-tuks are widely used, and buses provide a low level of service while the LRT and subway systems provide a high quality of public transport services for citizens. Bangkok also operates a high-level BRT line as an experimental project. The Thai government and Bangkok city government seems to have a keen interest in expanding urban rail systems such as the subway and LRT, but the priority should be put on the bus system rather than urban rail systems.

Phnom Penh has a very weak history of public transport development because it had suffered a lot from political oppression, such as the Khmer Rouge, an extreme leftist experiment in Cambodia during the 1970s. The Khmer Rouge regime totally destroyed the capital city and made it a ghost city until it fell in 1979. Due to this negative experience in government, the Cambodian people seem not believe in public transport, but use private modes, such as motorcycles and private cars. The city has just started the operation of 10 medium-sized buses in February, 2014. Without them, the capital city does not have any public transport system for about one million citizens. Citizens depend on mainly motorcycles and tuk-tuks for their mobility needs. The Phnom Penh City government has been running a bus line that serves 36 stops along Monivong Boulevard since February, 2014. The city government has been running buses since April, 2014 after a Chinese firm, Global (Cambodia) Trade Development, that was given the operating contract for the bus line pulled out after being refused tax breaks for its metered-taxi business.

Recently, the number of private cars has been increasing and traffic congestion has worsened on several main trunk roads in the city. About 300,000 cars and one million motorbikes now accelerate traffic jams in the city's streets. The Phnom Penh City government is trying to improve public transport by providing more bus services. In 2014, the city government is going to run 40 more buses on two new bus lines. In that case, the total number of buses will be 50 and the total bus lines will be three by the end of 2014. Without a private company partner, the government plans to

create an autonomous transport authority, which will run the current bus line and the two others being planned.

2.4 Lack of Utilization of BRT

Jakarta has an excellent BRT system called the TransJakarta Busway on which BRT vehicles run on exclusive lanes, which secures on-time performance and reliability because they do not compete for road space with private passenger cars. The BRT system can carry up to about 30,000 passengers in one direction per hour. According to a survey conducted by the TransJakarta Busway, 14% of the total number of BRT passengers previously used private cars.

But the BRT system also has some problems: Low accessibility at stations if it had elevated viaducts, lack of integration between BRT, urban railways, and general bus services, and violations of motorcycles and cars in the exclusive lanes.

Although Jakarta has an excellent BRT system, other ASEAN countries but Bangkok have not adopted it for the improvement of public transport services. Hanoi is constructing BRT and Vientiane and other cities are planning to have the system.

Figure 2.12 TransJakarta Busway in Jakarta

2.5 Lack of Public Transit Integration

Integration between modes such as bus and rail and between buses in central areas is much less evident in ASEAN megacities. I understand that most of these megacities do not have basic transport infrastructure such as roads and public transit systems to integrate. But it is recommended that ASEAN megacities consider the integration of public transit systems in terms of transfer facilities, fares, and operations.

The main complaints about urban railways are low frequency and slow journey times, as well as inaccessibility. The capacity of rail is not sufficient enough to serve the key centers and further enhancement is required. Also, many public transit stations in ASEAN megacities are poorly integrated with other modes. The common problem of urban railway networks is capacity constraints to meet the current passenger demands.

For example, since Bangkok does not have fare and transfer integration among BRT, Skytrain, ARL and MRT, the disintegration of those systems causes inconvenience for citizens. Seoul also has such a disintegration problem in the transfer integration between regional train stations and subway stations. The main rail station in Seoul, which is a symbolic mark of Korea, is located quite far from a subway station. Due to the distance between the two public transit systems, countless people have to waste time for walking and take an escalator from the subway station to the regional railway station. Since the central government manages the plans and facilities of the regional railways, and the Seoul City government controls those of the city subway, the separation of transport administrations did not allow the integration of the two systems in Korea. The Korean government did not seriously consider the transfer integration of inter-city and city rail systems. I strongly hope that ASEAN countries should not make this kind of mistake.

3. Implementation Problems of ASEAN megacities

Since ASEAN countries have implementation problems, they cannot solve the common problems of motorization, traffic congestion, and air pollution by developing public transport systems. ASEAN megacities require huge investments for construction of MRT and BRT, but they do not have stable sources of funds and do not mobilize private capital or utilize ODAs well.

Most of them also do not have a leading public transport organization and a transport think tank. In addition, they lack planning capability and do not have transport database which support transport planning. More importantly, they do not have strong political support and commitment for public transit.

3.1 Lack of Financing Mechanism for Public Transit

ASEAN megacities have similar transport problems, and most of the solutions for them have already been proposed as urban transport master plans by foreign agencies such as the World Bank, ADB, KOICA and JICA. The hidden problems are a lack of political commitment, the deficiencies of leading organizations, and no financing mechanism for policy implementation. At the first ASEAN-Korea public transport workshop in Manila on 6 March 2014, workshop participants reached a consensus on these problems. There are similar transport problems, such as an increase in cars, traffic congestion, and air pollution in ASEAN megacities. Most of the solutions to these problems have been already suggested as I pointed out. More importantly, I think that ASEAN megacities with a population of about 10 million need to construct at least 10 MRT lines, as the case of Seoul shows. The most crucial part is to create a financing mechanism to construct them. A stable financing mechanism for public transport and transport infrastructure that is based on fuel taxes is required.

3.2 Lack of Mobilization of Private Capital

Although ASEAN megacities have a lot of traffic demand for public transport, they do not utilize it to provide public transport services by attracting private companies. Citizens in these cities have high mobility needs to commute to work every day or enjoy other social activities. For example, Manila's LRT is running at full capacity. The congestion rate of the LRT seems to be about 200 percent. With this high traffic demand, it is possible for a private company to construct and operate urban railways or BRT and make a profit. In Seoul and other large cities in Korea, private bus companies have provided bus services for citizens for 50 years without receiving any subsidy from the government. From the 1950s to 1990s, the bus business was considered to be a profitable one. In Japan, private

railway companies construct and operate urban railways as a profitable business. Japanese companies receive a high level of fares and utilize value capture methods to fund urban railway projects.

3.3 Lack of Leading Implementation Organizations for Public Transportation

ASEAN megacities need a leading implementation organization for public transport. Due to the complicated issues that governments have to face when they try to construct urban railways, a leading organization is necessary for a city government. Most ASEAN megacities do not have such a leading public agency to make public transit plans, implement public transit policies, construct public transit facilities, and operate public transit modes.

3.4 No Transport Think Tanks

The creation of a national think tank for transportation is essential for the continuity of projects. It is easy to think that a national think tank for transportation may not be essential for the development of public transit systems. First of all, if a country wants to implement a public transit policy, it needs a logical and empirical backup by professional experts. Without such professional efforts, no transport policy can be adopted as an official policy and have any chance to be implemented in reality. Second, the transport experts in think tanks will keep their positions, and they can promote the reasons why the government should invest in public transit. Although public officials often move from their positions, the experts stay in their positions and provide invaluable information to society for the development of public transit systems. Most ASEAN countries do not have transport-specialized and independent research institutes.

3.5 Lack of Effective Regulations for Public Transit

There is also a general lack of effective regulations and enforcement in ASEAN countries. These issues need to be addressed through a new regime controlled through an improved regulatory framework that matches

improved service delivery with public transit network planning that takes into consideration land use changes and the relationship between bus services and the other land public transport modes in the hierarchy. This will ensure better integration in order to meet the needs of present users and ensure that services become attractive to a wider range of potential users.

3.6 Deficiency of transport databases

Transport data collection and tools are inadequate in ASEAN countries, and there is also a problem in maintenance. When a government makes a plan for a public transit system, such as MRT or BRT, it needs to forecast traffic demand so that it can find out whether a project has economic feasibility. If it is economically feasible, it will be constructed and operated to provide services. If it is not economically feasible, it will be discarded. To make a correct forecast of traffic demand, a government needs to have a well-established database of transport behavior. It takes a long time to construct a transport database since the government has to conduct extensive surveys of citizens.

3.7 Lack of Planning Capability

Planning capability is closely related to transport databases. If ASESN countries do not have transport databases, they cannot properly forecast the traffic demands of citizens. Accurate forecasts are a key issue to determine whether a public transit system will be constructed or not. Korea and other advanced countries still have a serious problem of overestimation of traffic demand. ASEAN countries are also going to make a lot of errors in forecasting the traffic demand for a newly constructed public transit system. After the errors that urban transport planners make, ASEAN countries can build up a reliable planning capability.

3.8 Lack of Utilization of ODA

To develop the public transport systems of ASEAN megacities, ASEAN countries should utilize official development assistance (ODA) from

foreign agencies in a maximum way. ASEAN countries should have a good knowledge of application procedures to receive foreign assistance. For example, in order to apply to qualify for a KOICA project, the host country must fill out a project concept paper, coordinate with the host country's respective aid coordinating ministry, and submit the concept paper to the KOICA office, at which point the KOICA headquarters will assess the submission. ASEAN countries should know that the application process should be done at least two years in advance if they want to receive foreign aids for their public transit systems. Many ASEAN megacities still need a lot of help from foreign countries, but public officials in those megacities seem not have detailed knowledge of ODA.

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CHAPTER

3

Vision

Changhwan MO

The vision of public transportation in ASEAN megacities is to have a human-oriented public transport system for low carbon and green growth. To achieve this vision, the goal is to strengthen public transport systems in these megacities. In other words, the goal is to expand the roles of public transit systems extensively. According to the goal, this study aims to propose strategies to realize the vision in reality. Until now, several foreign agencies, such as the World Bank, ADB, and JICA, have proposed various public transit master plans which include the construction plans of urban railways, those of BRT, and expansion plans for buses. But the key issue is that those flashy master plans have not been implemented in practice.

This study aims to propose implementation strategies for improving public transit in ASEAN megacities. It is not going to reiterate proposing another master plan that shows how many subway lines will be constructed and where BRT corridors should be constructed. Instead, it attempts to suggest transport financing mechanisms, transport organizations, legal systems, and capacity-building issues to ASEAN countries for implementing public transit plans. Through this study, I would like to propose strategies to strengthen the implementation capabilities of ASEAN countries according to each transport environment by removing the hidden gaps between the master plans and implementation.

The vision of transportation in ASEAN countries is to build human-oriented transport systems for low carbon and green growth. This vision is justified when climate change, which is caused mainly by greenhouse gases (GHG) such as CO_2, is really happening in the world. "Vulnerability to climate-related disasters in the ASEAN region is among the highest in the world. Globally in 2013, natural disasters, including the catastrophic typhoon Haiyan in the Philippines, cost more than US$192 billion in economic losses, according to research from Aon Benfield Analytics. In addition, coastal flooding is expected to remain a significant threat to a

Table 3.1 Vision and goal of transport systems in ASEAN countries

Vision	
Build Human-Oriented Transport Systems for Low Carbon and Green Growth	
Goal	
Strengthen Public Transportation Systems	
Strategy	
Financing	• Special account for public transport • Value capture • Private-public partnership (PPP) • Utilization of ODA
Organizing	• Leading public transport agency • Transport think tank • Transport database center
Planning	• Developing planning capability • Integration of public transit • Transit-oriented development • Sustainable policy • Pedestrian policy • Utilization of Technology for transportation
Phasing	• Bus reform • Two-phased development of mass transit from BRT to MRT
Legislation	• Enacting public transit laws • Enacting an Act for transport disadvantaged persons • Enacting an Act for low carbon and green growth in the transport sectors

large share of the population of many of Southeast Asia's biggest cities, including Jakarta, Ho Chi Minh City and Hai Phóng in Vietnam, Yangon, and Bangkok." (Solheim, 2013).[1] To reduce GHG, it is necessary to build low-carbon, human-oriented transportation systems. A sustainable transport system refers to a human-oriented transport system based on public transport rather than a car-oriented one.

1. Low Carbon and Green Growth

Low carbon means a policy direction to reduce greenhouse gas (GHG) emissions. Since the transport sector produces a lot of this and automobiles produce most of it, it is important to reduce the modal share of automobiles and to expand that of public transit. According to the IPCC (Inter government Panel on Climate Change), global warming is attributable to GHG emissions from fossil fuel combustion. "The transport sector accounts for about 20% of greenhouse gas emissions and is the second-largest emitter in Korea, trailing only the industrial sector. Within the transportation sector, road transportation dominates, as it accounts for more than 80% of emissions." (Hwang, 2010, p.15) It is critical for ASEAN countries to transform the current automobile-based transport system into an energy-efficient and eco-friendly one.

Green growth means a growth strategy in which a country fosters economic growth and development with green technologies that help to reduce GHG emissions. It is a new policy paradigm that emphasizes ecologically sustainable economic growth and fosters low-carbon industry development. It discourages governments and companies from investing in carbon-intensive and environmentally damaging transport facilities and modes. Instead, it seeks to spur investment and innovation in the transport sector. For example, electric and hydrogen cars are promising green growth technologies, and the development of efficient charging systems will be a green growth business model to commercialize these types of cars. "Transforming our transportation system into a low-carbon and environmentally friendly one would provide many opportunities for green

1 Solheim, Erik. (2013). "Toward Green Growth in ASEAN." In *ASIA*. The ASIA Foundation. June 4. <http://asiafoundation.org/in-asia/2014/06/04/toward-green-growth-in-asean/> (Accessed on Sept. 2, 2014).

growth and also indispensable infrastructure for sustainable economic growth and prosperity." (Hwang, 2010, p.20).

The concept of green growth was developed in the field of the environment, where sustainable development has been widely discussed. "Green growth began to be seriously discussed in the international community beginning with the fifth Ministerial Conference on Environment and Development in Asia and the Pacific, 2005, sponsored by UN ESCAP. Green growth, defined by UN ESCAP, focused more on environmentally friendly growth instead of sustainable development." (Lee, Jung, and Lee, 2012, p.4).[2] In 2011, the OECD also defined green growth as "fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this, it must catalyze investment and innovation, which will underpin sustained growth and give rise to new economic opportunities." (OECD, 2013, p.14).[3] The implicit assumption of sustainable development in the field of the environment is that there is a trade-off between environmental sustainability and economic growth. "Green growth seeks to remove this trade-off." (Hwang, 2010, p.15). Green growth provides an opportunity to create jobs and attract firms and investments, while improving environmental quality and contributing to address climate change challenges. "According to a United Nations report on green growth, boosting global investments in renewable energy to US$630 billion by 2030 would create at least 20 million additional jobs worldwide, making it a much larger source of employment than today's fossil energy industry." (Brown, 2013).[4]

For example, the Korean government announced a national green growth plan in 2009 to increase investments in low-carbon and innovative technologies for renewable energy, waste management, public transportation and construction, and to create new and quality jobs in

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2 Lee, Jae Won, Jung, Ho Seog and Lee, Tae Jik. (2012). Korea's Green Growth based on OECD Green Growth Indicators. Daejon, Korea: Statistics Korea.

3 OECD. (2013). Green Growth in Cities, OECD Green Growth Studies. OECD Publishing. <http://ds.doi.org/10.1787/9789264195325-en> (Accessed on Sept. 5, 2014)

4 Brown, Kourtnii S. (2013). "Korea Leads Way for Asia's Green Growth." In *ASIA*. The Asian Foundation. April 24.<http://asiafoundation.org/in-asia/2013/04/24/korea-leads-way-for-asias-green-growth/> (Accessed on 3 Sept., 2014)

these sectors to offset the loss of employment in current carbon-intensive industries, such as mining, petroleum refining, and fossil fuel power generation. In July 2009, the Korean government announced its "National Strategy for Growth" through 2050, providing a blueprint for transforming its carbon-intensive economic structure into a low-carbon green growth one. The national green growth strategy announced by the Korean government is as follows: Reduction of greenhouse gas emissions, achieving energy independence, capacity building for climate change, development of green technology as a new growth engine, encouragement of green industries, promotion of high-value industries, laying the foundation for a green economy, development of green land and transport, green renovation in daily life, and leading green growth in the world. The target goal was to reduce greenhouse gas emissions by 30% from a business-as-usual path by 2020, and increase the country's renewable energy to 11% of total energy supplies by 2030.

In Korea, green growth is considered a new engine of economic growth. The Korean government created the Presidential Committee on Green Growth, which aimed to coordinate conflicting interests among stakeholders. The committee defines green growth as follows (Lee, Jung, and Lee, 2012, p. 4):

> *Green growth is designed to reduce greenhouse gases and environmental pollution. At the same time, it is designed for environmental preservation and economic growth. The industrial development and economic growth that have been underway so far have caused side effects such as energy depletion and environmental damages. However, green growth protects the environment and makes new industries and jobs with clean energies such as solar, wind, tide/wave/ocean, hydropower and green technologies instead of fossil fuels like oil and coal. It becomes a new locomotive of national economic growth. The key to green growth pursues economic growth by minimizing the use of natural resources and environmental pollution so that it makes a virtuous cycle.*

The Korea government also enacted the Basic Law for Low-Carbon Green Growth to support its green growth policies. The law also includes transport-related articles such as the promotion of environmentally friendly vehicles, promotion of eco-friendly transport systems on a national scope, and formation of low-carbon transport systems. The content of

the formation of low-carbon transport systems includes the application of transport demand management measures such as congestion charges, exclusive bus lanes, and intelligent transport systems, facilitating domestic maritime transport, setting up a modal share target, expansion of public transit, promotion of a railway-oriented network, and setting up a target for national greenhouse gas emissions in the transport sector.

Low carbon and green growth is the most urgent and proactive policy direction for ASEAN countries to ensure a high quality life and sustainable economic growth. More specifically, "low carbon and green growth require diminishing greenhouse gas (GHG) emissions and environmental burdens in the process of economic growth and simultaneously developing and utilizing green industries for further economic developments." (Hwang, 2010, p.16)

It is true that the transport sector, which accounts for a significant portion of total energy consumption, is one of the notorious industrial sectors that exacerbate global warming with greenhouse gas and noise emissions. The global community has been striving to respond to climate change. As a result of these efforts, the global community is experiencing a new policy and technology paradigm called "low carbon and green growth."

Table 3.2 GHG emissions in the transportation sector in Korea

Modes		GHG (million CO_2eq)	Share (%)
Road	Private	61.07	57.67
	Commercial	24.64	23.27
Road subtotal		85.71	80.94
Rail	Regional	1.43	1.35
	Urban (Subway)	0.52	0.49
Rail subtotal		1.95	1.84
Water		11.61	10.97
Aviation		6.62	6.25
Transport total		105.89	100.00

Source: Hwang. (2010). p. 19.

Transport policy in ASEAN countries has centered on cars and roads rather than on people and public transit. People in ASEAN countries have become more and more dependent on automobiles for socioeconomic activities. One of the most salient characteristics in ASEAN megacities is

the rapid expansion of automobile use and roads. Rapid motorization in the region causes air and noise pollution, traffic congestion, and finally climate change. "The Intergovernmental Panel on Climate Change (IPCC), which is a United Nations subsidiary, predicts that the average temperature will increase by 1.8 to 4 degrees Celsius over the next 100 years and the sea level will rise by 58 centimeters." (Hwang, 2010, p.15) Hwang (2010, p.15) also argues that "Rising sea levels could threaten to flood low-lying areas and islands, threaten coastal populations, erode shorelines, damage property and destroy ecosystems. The rising temperature could also cause dangerous consequences such as stronger storms and more heat-related illness and deaths." ASEAN countries are not immune to global climate change, as ASEAN megacities are suffering from chronic traffic congestion and air pollution.

Low carbon and green growth in transportation has also been a major concern for ASEAN countries. Both vehicles and traffic demand have been rapidly increasing, and private automobiles have become the major source of urban air and noise pollution in many ASEAN megacities. As a result, transport energy consumption in ASEAN countries has been also increasing since both passenger and freight transport demand is going to increase very rapidly.

2. Human-Oriented Transport Systems

Most ASEAN megacities have implemented car-oriented transport policies such as road-based policies, elevated roads, cheap fuel prices with energy subsidies, and overpasses and underground passes. It is time to completely change the policy direction to a human-oriented transport system. This is a soft and warm transport system for the disabled, the elderly, pregnant women, persons with a stroller, pedestrians, cyclists, and public transit users rather than automobiles and motorcycles.

The Korean government made a legal foundation to improve the mobility of transportation disadvantaged persons such as the disabled, the elderly, pregnant women, and children when the Congress passed the Act of Mobility Improvement for the Transportation Disadvantaged in 2005. The Act defines the transportation disadvantaged as five types: the disabled, the elderly, pregnant women, small children, and persons with a stroller. The disabled are handicapped persons who have registered with the government, the elderly are those over 65 years old, small children are

from 5 to 9 years old, and persons with babies are those who accompany babies between 1 and 4 years old.

In 2006, the percentage of the transportation disadvantaged by total population in Korea was 24.6% (Ministry of Construction & Transportation, 2007). Among them, the elderly composed 9.1% percent, the highest percentage among the transportation disadvantaged. The disabled composed 2.6%, pregnant women 0.9%, small children 6.7%, and persons with babies 5.3%. It is forecasted that while the birth rate will gradually decrease, the number of elderly is going to significantly increase. To meet the demands of transportation disadvantaged persons, it is highly expected that the Korean government will improve transportation services for them.

The background of the Act is both an urgent necessity for a system to improve mobility for the transportation disadvantaged and the need to reestablish the government's role in providing transport services for them. The vision of the Act is "barrier-free transportation." The strategies to achieve this vision can be summarized as follows: A barrier-free pedestrian environment, development of mobility hubs in regions, increased accessibility to mass transit, provision of customer-oriented information services, social recognition of the transport disadvantaged, and R & D projects for mobility improvement.

The objectives of the Act are to improve mobility facilities, transportation vehicles, and the pedestrian environment, to provide a financing mechanism to improve mobility for the transportation disadvantaged, and to make a barrier-free society so that the transportation disadvantaged can freely move to lead their lives as others do. The Act also established the new role of government to provide transport services for the transportation disadvantaged. In short, the ultimate goal of the Act was to establish a human-centered transport system in Korea.

To make a barrier-free pedestrian environment, the basic direction is to remove barriers on pedestrian streets and to consider the movement route of the transport disadvantaged. The details of the strategy are to construct pedestrian priority areas and establish a barrier-free certification system. The Korean government provides a barrier-free walking environment for transportation disadvantaged persons. It is cost-effective work, first by the removal of barriers on walking streets for the comfortable walking of the transportation disadvantaged. At the stage of planning of buildings and cities, it considers the mobility line of transportation disadvantaged persons.

Universal design is also closely related to the barrier-free transport system. It originated in the United States and is rapidly spreading in transportation infrastructure sectors. The basic idea of this emerging trend is to design services, facilities and infrastructure that are accessible not just to those who can use standard services, but as much of the population as possible, and further to supplement specialized provisions for those who cannot cope. During the past decade, since the legislation on convenience improvement in 1997, Korea has also endeavored to improve public transport modes, passenger facilities and pedestrian environments for the transportation disadvantaged. Nevertheless, improving the mobility standards of transportation infrastructure could be an inefficient and expensive solution if the transportation disadvantaged were the only beneficiaries. Universal design, however, aims to construct a human-based transport system that helps everyone, not just those with disabilities, because a transport system for the transport disadvantaged will be convenient for all people. For example, low-floor buses are convenient not only for disabled persons, but for all bus passengers. Therefore, improvements in transportation infrastructure, facilities, and modes give benefits not only to the transport disadvantaged, but also the general population.

3. Direction of Strategies

To achieve the goal of low carbon and green growth, ASEAN megacities are required to tackle the problems of inefficient energy consumption and air pollution in transportation by implementing the strategies of a modal shift to low-carbon and non-motorized transportation, environmentally friendly land use and the improvement of energy efficiency in the transport sector. The greening of the current transportation systems of ASEAN megacities requires a long-term vision and multifaceted approaches.

Due to its high energy efficiency, rail is the most environmentally friendly mode. But the potential of rail systems has not yet been fully utilized in ASEAN megacities since they require a huge sum of money to construct and operate. The importance of the environment and energy efficiency is attracting particular attention, which in turn leads to growing interest in environmentally friendly and energy-efficient rail transportation. “Land use and urban design should reflect energy and environmental considerations. Technologies should be provided not only for technological development,

but also for behavioral changes in transportation." (Hwang, 2010, p.20)

This study presents five macro-transportation strategies with 18 micro strategies aimed at helping ASEAN countries achieve low-carbon green growth and lead them to contribute to reducing CO_2 emissions to prevent climate change. The five macro strategies are financing, organizing, planning, phasing, and legislation. For financing, there are four micro strategies: special account for public transportation, value capture, PPP, and utilization of ODAs. For organizing, there are three micro strategies: leading public transport agency, transport think tank, and transport database center. For planning, there are six micro strategies: developing planning capability, integration of public transit, transit-oriented development, sustainable policy, pedestrian policy, and utilization of technology. For legislation, there are three micro strategies: enacting laws for the promotion of public transport, enacting an Act for the transport disadvantaged, and enacting an Act for low carbon and green growth in the transport sector.

What is most urgently needed is to secure public transit funding mechanisms to expand urban railway systems in ASEAN megacities. By using stable funding mechanisms, the megacities are able to construct and operate MRT and LRT lines. It is necessary to build green transportation cities by promoting high-density mixed-use urban development around rail stations and BRT stops and securing green pedestrian space. Compact development based on public transportation will encourage citizens to use more energy-efficient means of transportation. Non-motorized forms of transportation provide zero carbon emissions. Bicycles are popular in many European and Asian cities, but construction of bike lanes, related facilities, and regulation changes are needed.

Another important tool for environmentally friendly transportation is travel demand management (TDM), since investments into transport infrastructure are often very costly, and more importantly, the supply of highways does not improve traffic conditions since the increase in capacity is usually reduced by a further increase in traffic demand. Transport demand management is essential for the development of green transportation cities. "TDM means a policy or a strategy to adjust transportation demand to an appropriate level through changes in drivers' behavior. TDM strategies through the supply of transport services have a big traffic transfer effect but require considerable investment in traffic facilities. In contrast, TDM strategies based on adjustment of restrictions have a relatively small traffic transfer effect but are easier to implement due to less required investment in transport facilities. However, when implemented, such strategies may

face social resistance." (Yun & Park, 2010, p. 30) Low-cost TDM strategies are intended to affect traffic demand, particularly single-occupant vehicle demand, and optimize system performance, reduce peak period congestion, save energy, and improve the environment.

For the successful implementation of strategies for low-carbon green growth, a cooperative system among central and regional governments should be built under the strong leadership of a leading public transport agency. Also needed is the revision of relevant laws and institutions that can back up endeavors to enhance the political and social capacity to accommodate the strategy. Current heavy fossil fuel dependence should be reduced by diversifying energy sources in public land transportation. For example, wireless electricity technology could facilitate the expansion of electricity and hydrogen vehicles by solving the technological limitations of their battery storage capacity and charging speed.

ASEAN megacities need to make a plan at the metropolitan level, taking into account the major development and public transport issues. The plan should promote the growth of the megacity region (MCR) as a competitive hub for economic growth, while avoiding urban sprawl. The overall connectivity of the metropolitan area should be strengthened with the improvement of public transportation services. In addition to the strengthening of connectivity, infrastructure development should strive towards developing a multi-modal transport network. Additionally, measures should be taken to improve traffic and demand management in order to combat traffic congestion.

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CHAPTER

4

Strategies

Overview of Strategies

Changhwan MO

Megacities are the engine of national economic growth. They produce both goods and services on an economy of scale to improve international competitiveness and promote creativity in social and economic activities. Transport services work as a driving force to increase social and economic activities. Therefore, public transport is required for economic growth and a better society.

To achieve the vision of low carbon and green growth, ASEAN megacities should not follow the urban transport development model of megacities in the United States, which is mainly based on roads and is car-oriented. Simply put, a road supply policy cannot solve traffic congestion at all, and can actually worsen it. Due to the high density of the ASEAN megacities, unlike American megacities, car-oriented policies are not effective in meeting traffic demands. Instead of the American model, they need to follow Asian models, such as Korean and Japanese public transport ones.

Before providing public transport strategies for ASEAN megacities, it is necessary to answer these two questions: Do ASEAN megacities have to follow the public transport development model of Japanese megacities, which is based mainly on privately provided, rail-dominant and highly priced transport, or do they have to follow that of Korean megacities, which is based mainly on public-provided, rail and bus-balanced, and low-priced transport? I think ASEAN countries should follow the model of Korea since the ASEAN governments have to promote the use of public transportation and support citizens who are using mass transit. I would like to emphasize that public transport users deserve to get respect and rewards from the society.

Since the fare levels for Japanese public transit are much higher than those for Korean, most urban rail companies are making a profit in Japan. Due to the high taxi fares in Japan, for example, ordinary citizens cannot use taxi for private purposes, but only for business. Since the

fares for the Shinkansen are also very expensive, and expressway tolls are very high, many people cannot easily use high-speed railway services and expressways.

To escape from the vicious cycle of an urban transport system that accelerates motorization, road supply and traffic congestion, governments should invest in public transport systems. At the workshops in Manila and Jakarta, these public transport strategies to reverse the vicious cycle of urban transportation in ASEAN megacities were discussed: Creation of a special account for transportation, creation of a national think tank, transport governance and a public transport agency, utilization of value capture, utilization of PPP, transit-oriented development (TOD), improvement of the pedestrian environment, utilization of ICT technology, integration of public transport systems, introduction of BRT systems, improvement of bus systems, utilization of electric buses and trams, standardization of transport databases, Intelligent Transport Systems(ITS), transport welfare policies for the disadvantaged, and improvement of regulations.

Among those strategies, there are several for the development of public transportation systems in ASEAN megacities. First, a transport financing system is required to have a stable source for public transit investments by creating a special account for transport facilities. Second, those megacities need to adopt new funding mechanisms, for example, PPP and value capture.

The third strategy is to increase public transport investments, including for the reduction of GHG emissions in the transport sector. Fourth, it is also recommended to change bus fuels from diesel to gas or electricity. Fifth, a strategy of transit-oriented planning and development is a primary factor in improving public transport systems. It will allow the best use of land and proper transport planning for the ASEAN megacities.

Sixth, for the long-term development of public transport in ASEAN megacities, it is required for political and government leaders to provide commitment and leadership. Seventh, the utilization of technology for public transport is suggested, and eighth, a great strategy is to share best practices in ASEAN megacities.

Other strategies are as follows: efficient operations of public transport organizations, modernization of public transport infrastructure, discouragement of motor vehicle ownership and use, effective regulation and legislation for public transport, and development of public transport business models.[1]

Almost all of Southeast Asia lies in a tropical zone. The hot and humid weather of ASEAN megacities is a critical factor in developing public transport strategies for low carbon and green growth. Due to the weather, citizens in ASEAN megacities do not want to take long walks to bus stops or urban railway stations. Instead, they prefer to drive motorcycles or private cars from door to door. But as I pointed out the case of Singapore, public transportation can be fully developed in ASEAN countries in spite of hot weather.

Rapid urbanization has been a striking feature of Southeast Asia's megacities. For example, Bangkok in 2010 had a population of 14.5 million, while the population of the city in 1945 was only 0.8 million. Jakarta in 2010 had a population of 15.3 million, while the population in 1945 was just 0.6 million. "At the end of the Second World War, both of these cities had populations of less than a million. Sixty-five years later, the population of greater Bangkok was over 18 times larger, while greater Jakarta's had grown by more than 25 times its 1945 figure." (Osborne, 2013, p.11). The fast-growing ASEAN megaciries are magnets for the rural citizens who flock out of the country, where they often see little hope to get a decent job and have excellent education. For them, the megacities are attractive because they provide a precious opportunity for employment and education. "The continuing growth of Southeast Asia's major cities places tremendous strains on governments faced with the need to provide services for their populations and to find work for those seeking employment." (Osborne, 2013, p.11)

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1 Iryantomo, Felix. (2013). "Towards Green and Sustainable Road-based Public Transport for Greater Jakarta (2010-2014)." In *Proceedings of ASEAN-Korea Capacity Building Program in Korea Education Program*. 17-26 February. Goyang, Korea: The Korea Transport Institute.

1. Creation of a Special Account for Public Transportation

Changhwan MO

Large ASEAN megacities, such as Jakarta, Manila, Hanoi, Kuala Lumpur, and Bangkok, need to construct at least 10 subway lines to meet increasing traffic demands and to reduce air pollution to achieve the vision of low carbon and green growth. For example, although the Seoul metropolitan area has 10 subway lines and several more urban railway lines to connect Seoul and Gyeonggi Province, it still has traffic congestion problems.

To construct about 10 subway or MRT lines, these megacities require a huge sum of money to invest into public transport projects. At present, these cities are likely to depend on foreign financing sources, such as foreign aid or loans, to construct them. It would be alright for them to depend on foreign financing sources if they construct only one or two MRT or LRT lines. However, if they want to construct about 10 MRT lines, they need to have their own systematic financing mechanism because they have to continue investments into public transport in the future.

If a city depends on foreign aid or loans to construct MRT lines, it has to have different technology and design of MRT by donor country. This will eventually cause integration costs from different technology and design for the city in the future. For example, Hanoi is constructing several MRT lines with different donor countries, such as Japan, China, and Germany, whose MRT systems are different from each other.

For the source of the public transport financing mechanism, the government should consider a transport tax for fuels. Private auto owners consider only private costs such as fuel costs, toll fees and parking lot fees when they decide to drive a car. However, automobiles cause additional social costs, such as air pollution, for society. Due to the rapid motorization of these cities, social costs will accordingly increase. It will be efficient if the cities impose a fuel tax for the social costs caused by automobiles.

More importantly, it will be the most efficient way if they use the money collected from the tax to provide public transportation services. For example, Indonesia provides a government subsidy to keep fuel prices low. If the Indonesian government does not stop providing fuel subsidies and impose a tax on the social costs caused by private automobiles, it is almost impossible to have an environmentally friendly city since private automobile owners have incentives to drive longer distances.

For better transportation systems in ASEAN megacities, a law of special accounts for transport financing based on fuel taxes needs to be enacted. This is because without a reliable funding source, the problems of urban transportation cannot be solved at all. In addition, fuel taxes economically discourage the owners of motor vehicles from using them.

1.1 Korea's Special Account for Transport Facilities

A good example is Korea's special account for transport facilities. The World Bank acknowledges Korea as having one of the best practices, which made success in economic growth as well as sustainable transport. What made it possible were proactive investments in transport infrastructure and a fuel tax scheme for securing financial resources for infrastructure and public transport.

Although Korea experienced a rapid increase in automobile ownership in the 1980s, there was a relatively low state of investment in transport facilities. As a result, in the beginning of the 1990s, both traffic congestion and air pollution became worse than before. The expansion of transport facilities was low during from the 1980s to the early 1990s, even though the economic scale nearly doubled and there was a more than five-fold increase in automobile ownership.

In 1988, researchers at the Korea Transport Institute proposed to create a special account for urban transportation with the publication of a report on investment and financing mechanisms for urban transport. I participated in that research team as a junior researcher. They suggested that a small portion of a special tax on fuels and other automobile-related taxes could be utilized as stable sources for the special account. In 1990, the Ministry of Construction passed a law to create a special account for the construction of highways only, while the Ministry of Transportation passed a law to create a special account for the construction of urban railways. Due to the merger of the two ministries, Korea had a special account for transport

facilities that combined the two special accounts with other budgets for the construction of railways and airports.

In December 3, 1993, based on the "Act on Special Accounts for Transport Facilities," a special account for transport facilities was set up in which a special consumption taxes on fuels was converted into a traffic tax, and such a tax was used as a major financial resource for the smooth expansion and efficient management and operation of roads, railways, airports, and ports in Korea.

As described above, traffic congestion had emerged as a social problem in Korea in the early 1990s with an increase in traffic volume due to a rapid increase of private passenger vehicles, which was considered a cause for the deepening problem of traffic congestion. In order to ensure that stable financial resources were applied to the expansion of these transport facilities, the government used the Act to absorb the budgets for high-speed railways and airports that were financed by the general account and integrated the special accounts for road and urban railway projects.

This Act was succeeded by the "Act on the Special Accounts for Transport Facilities" in December 1995, and an account for wide-area transport facilities was established in April 1997. In December 2003, the law was revised to separate and create an independent account for urban railways under the special account for transport facilities. In July 2005, the law renamed the urban railway account as a public transport account.

In December 2006, the "transport tax" was revised into the "traffic, energy, and environmental tax," and in addition to its existing purpose, the financial sources were allowed to be used for "protecting and improving businesses related to the environment and energy." Additionally, the effective period was extended December 31, 2009. At that time, it was completely deleted and the temporary condition was changed into a permanent statute scheme. Also, the account for wide-area traffic was abolished and its functions were transferred to the special accounts for the development of wide-area regions.

1.2 Structure of Revenues and Expenditures of the Special Accounts for Transport Facilities

The main sources of the special accounts for transport facilities are constituted by tax revenues, such as the transport energy environment tax, non-tax revenues, such as facility use fees, and transferred general account

money. Of these sources, 800 out of 1,000 of the transport, energy, and environmental tax is transferred into the special accounts for transport facilities and is used as the most important source of revenue.

The transfer distribution rate, that is to say, the percentage of traffic, energy and environment tax being transferred into each account of the special accounts for transport facilities is defined in the Enforcement Rules. From 1989 to 1993, before it was integrated into the special accounts for transport facilities, 90% of the gasoline special consumption tax and the total amount of the light oil special consumption tax were allocated to the special account for road projects, and 10% of the gasoline special consumption tax to the special account for urban railway investments. Since 1993, both accounts have been integrated into the special accounts for transport facilities. During consultation between the ministries on the distribution rate, it was calculated that the accounts for roads got an allocation of 67.5%, the accounts for urban railways 13.5%, the accounts for high-speed railways and airports 9%, and 10% was allocated as a reserve.

In 1996, the accounts for high-speed railways were absorbed into the special accounts for railways, and thereby the account distribution rate for the railways increased from 13.5% to 18.2%, and the distribution rate for high-speed railways and airports was reduced from 9.0% to 4.3%. The accounts for high-speed railways and airports were changed into accounts for the airports in 1997. In the following year a new account for metropolitan transport was founded for the expansion of related facilities such as metropolitan roads and railways. The substitution effect of road projects by regional railway construction was taken in consideration. Thus, metropolitan road projects were separated from road projects and the distribution rate of the road accounts was reduced by 2.0%, from 67.5% to 65.5%, and the distribution rate of the accounts for metropolitan transport was put in the 2.0%, which was the reduction rate of the road accounts.

The accounts for urban railways were separated from the railway accounts in 2004, and transport taxes were newly allocated to the accounts for ports and urban railways. By reducing the allocations of transport tax to the road sector, investment into railways and port sectors was increased. Also, arrange scheme for the distribution rate of the transport tax for each account was introduced in June to flexibly correspond to the investment demands of the transport sector.

In 2005, the accounts for urban railways were changed into public transport accounts in order to procure and improve public transport facilities and funds for the advancement and diversification of public

transport. In 2010, the accounts for wide-area transport facilities were abolished and integrated into the special accounts for wide-area development. The accounts for public transport were changed into accounts for transport system administration again in 2011.

Table 4.1 The special accounts for transport facilities by the distribution rate

Account	Roads	Railways	Urban railways	Airports	Metropolitan transport facilities	Ports
Before revision(%)	65.5	18.2	(Included in Railways)	4.3	2.0	10 (reserved)
After revision (%)	51-59	14-20	6-10	2-6	2-6	10-14
Increase or decrease(%)	△14.5-6.5	△4.2-1.8	△1.3-2.7	△2.3-1.7	0.0-4.0	0.0-4.0

Note: Applied from January 1, 2005 on the basis of the Revision of the Enforcement Rules of the "Transport Accounting Act" (July 15, 2004).

1.3 Current Status of the Expenditures and Revenues of the Special Accounts for Transport Facilities

The total scale of the tax revenues for the special accounts for transport facilities amounted to US$11.7 billion in 2000 and gradually increased to US$14.3 billion as of 2012. The transport tax, which is one of the main financial resources for the special accounts for transport facilities, was at US$8.0 billion in 2000. Except for the year 2001, it has accounted for 53-72% of the special accounts for transport facilities, repeating increases and decreases. However, most recently in 2012, it has accounted for a slightly

Table 4.2 The current status of the expenditures of the special accounts for transport facilities during the recent five years

(Unit: US$, billion)

Divisions	Total	Roads	Railways	Public transport	Airports	Ports	Metropolitan
2008	12.61	6.64	2.15	1.30	0.21	1.65	0.65
2009	16.27	8.64	3.17	1.66	0.09	1.70	1.01
2010	14.00	7.30	3.37	1.23	0.65	1.45	-
2011	13.80	6.99	3.62	1.07	0.83	1.29	-
2012	14.30	7.54	4.24	1.13	0.12	1.27	-

Notes: 1) The metropolitan account was abolished in 2010 but was transferred to another separate special account for metropolitan development under a different law.
2) The public transport account was renamed to the account for transport system managmeent from 2011.
3) 1 US dollar = 1,050 Korean Won

higher rate of about 85%.

For the current status of the expenditures of the special accounts for transport facilities during the last five years, about 51-53% was spent on the road accounts, 17-30% on the railways accounts, 8-10% on the public transport accounts (renamed as the accounts for transport system administration from 2011), 1-6% on the airports accounts, and 9-13% on the ports accounts. Wide-area accounts were abolished in 2010, but its function was transferred to the special accounts for the development of the wide-area regions.

1.4 Policy Implications of the Introduction of the Special Accounts for Transport Facilities

I would like to emphasize that, unlike USA and Japan, Korea provides financial resources not only for roads but also for public transit by the transport funding system based on fuel taxes. Accordingly, ASEAN countries should create the special accounts for transport facilities including roads, railways, airport, sea ports, and public transit.

Since the establishment of the special accounts for transport facilities, the size of transport investment has continuously increased. The sustainable and stable expansion of social overhead capital, which plays the role of a driver in the economic growth in Korea, has achieved the goal (Ahn, 2013). In particular, in the case of transport facilities, because there are effects such as regional development in addition to the reduction of transport costs and shorter transit time, it contributes greatly to the development of the regional and national economy (Ahn, 2013). However, if the introduction of the transport budget is delayed or reduced, social and economic losses such as increases in logistics and traffic congestion costs may occur, so there is a need to find a solution to this. Furthermore, it is necessary to seek a method of efficient supply and operation of transport investment on the basis of securing investment funds.

In the investment in transport facilities, the necessity of consistently improving national competitiveness and at the same time, the possibility of inefficient budget investment and resource waste are inherent. There is a need to review efficient methods to secure financial resources for the special accounts for transport facilities and measures for the distribution rate by each account, taking changes in the economic and social conditions for the long and short term into account.

2. Utilization of Value Capture

Changhwan MO

Due to the significant lack of financial resources for governments, ASEAN megacities should take the utilization strategy of value capture in the construction and operation of urban railways. It is necessary for those megacity governments in ASEAN countries to adopt new methods to construct public transport infrastructure, and it is critical for them to learn policy lessons from foreign experiences and implement them for public transport financing in the future.

An increase of property value by public investments can be a key source of the investments, according to the benefit principle. Value capture is an efficient and equitable funding method for transit construction and operation since increases in the private property values generated by public investments are captured.

2.1 Background and Justification of Value Capture

Korea experienced a structural deficit and debt for urban railways. Korean megacities, such as Seoul and Busan, suffered from the financial burdens of subway construction and operation. First, high construction costs caused local governments to face financial difficulties. The accumulated debt of Seoul's subways in 2010 was US$3.91 billion: Seoul Metro had US$2.84 billion and Seoul Metropolitan Rapid Transit Corporation (SMRT) had US$1.07 billion. Although the central government funded 40% of subway construction costs, the Seoul City government had to cover 60%. In the past, the central government allowed the local governments to borrow money from banks or to issue bonds for covering the portion, more than 10% of construction costs, of local governments. Due to the debt of construction costs, the Seoul City government has been seriously suffering

from budget shortages.

(Funding Conditions of Central Government for Subway/ LRT Construction in Korea)

☞ Subsidy of central government: 60% of construction costs
* Exception: Seoul (40%)

① Population size of city: Over 500,000 residents
* Exception: A city has enough traffic demands for LRT
* For MRT (HRT): Population over1million

② Traffic demand: 10,000 persons/hour/direction at peak times
*Exception: Connection lines

③ Financial health of local governments: Debt should be less than 10% of total project costs
*Subsidy of central government: 60%
Local government's own funds: 30%
Debt of local government: 10%

④ B/C Ratio: Over 1
*Exception: Consideration of other policy factors in the case of close to 1.

Second, due to the operation deficit of subways, Korean megacities have also been experiencing financial difficulties. For example, the two Seoul subway public corporations recorded annual operation deficits from US$350 million to US$450 million from 2008 to 2012 because the subway fares were below the cost of the service production. Operation deficits have accumulated since those subway lines started operation with the construction debts.

Table 4.3 Operation deficit of Seoul subways (Unit: US$, million)

Year	Seoul Metro	SMRT	Gross
2008	- 133.24	- 213.43	- 346.67
2009	- 219.81	- 198.15	- 417.96
2010	- 237.78	- 205.37	- 443.15
2011	- 195.74	- 261.39	- 457.13
2012	- 160.00	- 184.07	- 344.07

According to the experiences of Korea, it is not possible to provide MRT or LRT services with fare revenues only. There is a vicious cycle of the accumulated debts of local governments that suffer from a lack of

financial resources. Thus, a new financing method for urban railways has been eagerly sought and value capture has been suggested as an effective alternative.

Value capture is defined as the acquisition of the value generated by transport or public investments. Some of this cannot be captured by investors directly in usual economic transactions. The target of value capture is usually the increase in property values around mass transit stations. Transportation investments mostly increase people's access to desirable destinations and locations. These investments mostly increase land and building prices, which gives a windfall profit to estate owners and developers. For example, a recent case of increases in property values by urban railway construction is Seoul Subway Line 9 in Korea.

Table 4.4 Value increase of Seoul Subway Line 9 in Korea

Distance from stations	Rate of value increase
250 m	11.6%
250-500 m	7.7%
500-750 m	6.0%
750-1 km	5.5%
Average	7.8%

Source: Sung et al. (2010).

2.2 Feasibility of Value Capture as a New Financing Method

The issue of income redistribution is raised when the government funds urban railways from a general budget account. It is best for the efficiency of capital allocation if the government uses the increase in property values, a windfall income, from the investments in transport. The value increase of property by public investments should be a key source of the investments, according to the benefit principle. Value capture is an efficient and equitable funding method for transit construction and operation since increases in the private property values generated by public investments are captured. The goals of value capture are improvement of the efficiency of capital allocation[2] and reduction of the inequality of income distribution.

2 According to the theorem of Henry George.

It is important to recognize that users of urban railways cannot pay for all the costs of public transport services. Moreover, it is not socially desirable to pay all the costs by using the fare revenue of urban railways passengers because the fare level becomes too high for citizens to easily use the transport.

2.3 Cases of Value Capture

Generally speaking, the construction of transport infrastructure can generate positive externalities, such as improving accessibility, raising land values, and increasing public tax revenue. In Japan, historically, private companies constructed railways and simultaneously bought adjacent land, and built residences or offices and earned profits by selling and leasing them. As a result, the population along the railway lines increased and such companies could operate the railway without subsidies. Furthermore, they constructed shopping malls and department stores for their business. In this way, the companies acquired part of the externalities. Recently, the Japanese National Railway was privatized, and the public authority of Tokyo Subway is about to be privatized in the near future. They are making great efforts to strengthen their competitiveness through businesses other than railway operation. For example, the East Japan Railway Company sold the rights of unused buildings above the Tokyo station to renovate the station. Some new lines were developed and held by new companies. Some incumbent companies are operating trains while paying the railway user charges. There are many ways to do value capture: the Japanese private railway model (Hankyu and Tokyu corporations), the railway and property model (MTR Corporation in Hong Kong), transferable development rights (Tokyo Station, Metropolitan Expressway in Tokyo), the new model in railway contraction (the construction of a new line to solve a bottleneck), and park construction projects (Central Park in New York). (Kitano, 2013)

2.4 Metropolitan Transport Facility Charge Scheme in Korea

Due to the expansion of living spaces following the rapid implementation of development projects, such as housing construction in metropolitan areas, including the Seoul metropolitan area, the commuting area in metropolitan areas expanded. In such a situation, the problem of metropolitan traffic had

seriously increased day by day. In order to solve this transport problem, the central and local governments took it as a basic principle to build metropolitan transport facilities with public funding and then procured and expanded resources accordingly.

However, there were limits to using only public funds for financing to solve the metropolitan traffic problems. In April 1997, a "metropolitan subway charge scheme" was introduced to secure funds, but there were no records of collecting funds since it was difficult to find clear criteria to select the objects of imposition. Thus, a scheme was required to improve institutional arrangements. In April 2001, the Ministry of Land, Infrastructure, and Transport (MLIT) expanded and reorganized the metropolitan subway charge scheme into the "metropolitan transport facilities charge scheme" to impose a portion of expenses on developers of housing complexes and other urban development projects to construct key transport facilities. This scheme was designed to efficiently solve the lack of transport facilities when developers constructed housing complexes in a suburb, for example.

The metropolitan transport facility charge scheme is a funding mechanism of government to provide metropolitan transport facilities caused by large-scale development projects. Therefore, charges are imposed on developers of urban development projects, such as housing projects and new towns, to share a portion of the construction costs for metropolitan transport facilities.

They are imposed to prevent the issue of fairness in the support of public financial resources from being raised, which may happen when wide-area transport facilities are financed only with public funds, and to restrain indulgent development that may proceed without considering transport facilities, one of the most important parts of urban infrastructure. The metropolitan transport facilities mentioned here are transport facilities that have the purpose of dealing with transport demand as defined in the "Special Act on Metropolitan Transport Management in Metropolitan Areas." This mean metropolitan roads, railways, parking lots and public vehicle garages that are spread over two or more special cities, metropolitan cities, and provinces.

In addition, the metropolitan areas for this charge scheme are specified by the enforcement ordinance of the Act among metropolitan cities and areas that are closely interconnected in terms of transport and living.

The specific cases in which charges for the construction and improvement of metropolitan transport facilities have to be paid are as follows:

- Housing site development projects according to the "Housing Development Promotion Act"
- Urban development projects according to the "Urban Development Act"
- Land development projects according to the "Housing Act" and apartment district development projects in accordance with the supplementary provisions of the Act
- Housing construction projects according to the "Housing Act" (with exemption of cases enforced within a district, zone, or project area in which a project from 1 or 3 is performed)
- Housing renewal, reconstruction, and urban environment adjustment projects according to the "Built Environment Renewal Development Act" (if it is planned to build apartment buildings for more than 20 households in the case of urban environment improvement projects)
- Other similar projects prescribed by presidential decree

Forty percent of the collected charges are transferred to the special accounts for metropolitan transport facilities among the special accounts for transport facilities according to the "Act on the Special Account for Transport Facilities." The remaining 60% moved to the special account for regional metropolitan transport facilities that are installed in the cities or provinces that collect charges and can be used only for the construction or improvement of metropolitan transport facilities specified in the "Special Act on Metropolitan Transport Management in Metropolitan Areas."

Charges are imposed on developers who receive development gains from land development, city development, and housing redevelopment, and housing projects pay a fee to cover part of the costs of providing facilities such as roads and urban railways in a megacity region. Metropolitan transport facilities are roads, railways, parking lots and public garages that cross at least two metropolitan cities or provinces.

Metropolitan transport facility charges are calculated based on the "Special Act on Metropolitan Transport Management in the Metropolitan Areas." The formulas for these charges are as follows:

① Residential Land Development:
Standard development cost per 1 m^2 × rate × development area × (floor area ratio/200) – amount deducted

② Housing Construction:
Standard development cost per 1 m^2 × rate × total floor area – amount

deducted

About US$178 billion was imposed as metropolitan transport facility charges in 2011, and out of this, US$139 billion was collected.

Table 4.5 Annual imposition and collection records of charges (including additional payments and refunds)

(Unit: cases, US$ billion, %)

Division	Imposition		Collection		Difference		Collection Rate
	Cases	Amount(a)	Cases	Amount(b)	Cases	Amount	(b/a)
Total	7,067	178.21	5,749	139.29	1,318	38.92	78.2%
2011	1,003	18.11	355	10.79	648	7.31	59.6%
2010	500	18.62	342	9.68	158	8.94	52.0%
2009	401	23.03	334	11.01	67	12.02	47.8%
2008	418	14.85	480	14.60	-62	0.25	98.3%
2007	629	17.73	518	15.41	111	2.32	86.9%
Before 2006	4,116	85.87	3,720	77.80	396	8.08	90.6%

Notes: 1) Change of case number and total sum due cancellation of charge, change of plan and refund cases;
2) Increased number of imposition cases due to a significant increase in urban life residences (20-30 years old), business plan approvals or building permits.
Source: Yu. (2013). p. 248.

The metropolitan transport facility charge was very helpful in preparing the large amount of financial resources required for transport infrastructure construction in the metropolitan areas. In particular, it is mentioned as a success story in which the financial resources were charged to those who caused the traffic demands. Additionally, up until recently, land prices in metropolitan areas had risen and given a lot of financial benefits to the developers, as well as the residents. Thus, the benefit principle was applicable, and in this sense, the metropolitan transport charges were considered as successful cases.

However, the bubble phenomenon of real estate in the large cities has disappeared recently and housing sites have not been sold to construction companies since the housing prices have become lower than initial sale prices. As a result, the collection rate of metropolitan transport facilities charges was lowered and this led to a vicious cycle by acting as a factor to increase the initial sale price of the housing and thus became a situation where they would not sell and the account balance of the large-scale development projects would be worsen. (Yu, 2013).

Even with the recent side effects, metropolitan transport facility charges

are considered to be a good method to prepare financial resources for large city transport infrastructure. There is a similar value capture system in the United States, Germany, Japan, and Canada: The developers of large-scale development projects have a portion of the financial burden of the infrastructure development costs imposed on them.

In addition to this, Germany operates a district public facilities charge scheme, Japan has a benefiter charge scheme, and Canada has a development charge scheme.

In this way, despite having different operations and forms, the schemes have a similar intent. The wide-area transport facilities charges can also be a good financial resource for the construction of transport SOC if the recent problems are adjusted little by little.

2.5 System of Metropolitan Transport Improvement Plan in Korea

The planner is the Ministry of Land, Infrastructure and Transport (MLIT) or metropolitan governments. The target of the plan is a large-size development project when the size of the project site is above one million square meters or the number of persons to be accommodated is above 20,000. If the metropolitan transport improvement plan has been completed, the central government and local governments have a mandatory obligation to implement it. The funding for the transport

Figure 4.1 Gimpo LRT

projects in the plan comes from developers, such as the Land and Housing Public Corporation (LH).

For example, Gimpo LRT, the Gimpo Gold Line, is going to be constructed with the system of the metropolitan transport improvement plan. The construction period is between March 2014 and October 2017 and the route is from Hangang New Town in Gimpo City to Gimpo Airport Subway Station in Seoul. The length is 23.63 km, and it has nine stations. The LRT system is an automated guided transit (AGT) system, and is going to be constructed mostly underground. The construction cost is estimated to be about US$1.25 billion, with US$1.11 billion coming from the developer of the new town and US$0.14 billion funded by the city of Gimpo. The developer pays almost 90% of the total cost for the construction of the LRT.

2.6 Implications of Korean Value Capture Cases

In the case of new towns, both the system of the metropolitan transport plan and the metropolitan transport facility charge are effective to fund the construction of urban railways by value capture. Those two methods

Table 4.6 Major transit infrastructure projects funded using value capture strategies in the USA

Project (status)	Value capture strategy	Revenue from value capture (millions US$)	Total project cost (millions US$)	Ratio (Revenue/cost)
Atlanta Beltline (planned)	TIF	1,700	2,800	61%
Seattle South Lake Union streetcar (completed)	SA	25	53	47%
Portland streetcar (completed)	TIF and SA	41	103	40%
San Francisco Transbay Transit Center (in progress)	TIF and SA	1,400	4,185	33%
Washington Metro NY Avenue Station (completed)	SA	25	110	23%
Dulles Corridor extension (in progress)	SA	730	5,250	14%
Los Angeles Metro Red Line, Segment One (completed)	SAs	130	1,420	9%
Seattle Bus Tunnel (completed)	SA	20	500	4%

Source: Government Accounting Office. (2010). *Public Transportation: Federal Role in Value Capture Strategies for Transit is Limited, but Additional Guidance Could Help Clarify Policies* (GAO-10-781). Washington, DC: Government Printing Office. p. 20.

work for funding the construction of urban railways in Korea. In the case of old towns, a new method is required to fund the construction of urban railways. It is necessary to attempt various methods, such as tax incremental financing (TIF), special assessments (SA), and impact fees around railway stations for value capture in urban centers.

TIF refers to a financing scheme in which local governments issue bonds guaranteed by future increases in property tax revenues to finance transport infrastructure. It is an indirect way to finance urban railways. For example, the U.S. state of California introduced this financing method in 1952, and most state governments use it as a financing method.

SA is a kind of tax assessed against areas that have been identified as receiving a direct benefit from transit investments. An assessment district is an area within which the government imposes a special tax on property owners who will benefit from a public project.

In the case of the development impact fee, developers pay the fee. The government imposes it on excessive increases inland value beyond normal increases by development projects, the change of land use, and other socioeconomic reasons. About half of the states in the USA which extensively protect private property rights impose the fee on significant development gains when society can create economic benefits. The development impact fee (DIF) system is also in place and utilized in states where development pressure is high, as in California, Florida, Oregon, Colorado, Texas, and Washington. It is a scheme that imposes the installation costs of various public infrastructure such as roads, sewers, etc. on development actors.

Table 4.7 Comparison of value capture methods

Classification	TIF	SA (Special assessment)	Impact fee
Target	Land and buildings	Land and buildings	Land and buildings
Formula	Increase of property tax by development-normal increase of property tax revenue	Price on completion –[price on plan confirmed +(price on plan confirmed × normal increase rate of price)]	Price on completion –[price on plan confirmed +(price on plan confirmed × normal increase rate of price)]
Ratio	Increase of property tax	Area 1: 70% Area 2: 50% Area 3: 30%	50% of development gains
Method	Issuing a bond guaranteed by future increase of property tax revenue	After completion, imposes the tax on property owners	After construction, imposes the fee

Source: Mo Changhwan. (2013). "Value Capture and Transit Funding: Focused on Urban Railway." In *Proceedings of the 11th ITPS- KOTI Joint Seminar 2014*. April 17. Tokyo, Japan. ITPS. p.33.

2.7 Discussion

It is questionable whether it is politically acceptable to collect unrealized value increases that are created by transportation investments from property owners in the urban center. Collecting money through value capture was carried out historically for the Osaka Municipal Subway Midosuji Line in 1933. Recently, it was carried out for Tokyo Waterfront Area Rapid Transit in 2002 and Yokohama Minatomirai Railway in 2004.

Many regulations are applied to developments around new stations by private or public rail firms in Japan. The key point is how the developers there can easily purchase and develop land around stations to create profits. Basically, it is conducted based on the City Planning Act. The beneficiary charge is also written in the Act. Land readjustment projects are conducted based on the Land Readjustment Act. Urban redevelopment projects are conducted based on the Urban Renewal Act. But the persuasion of owners for land purchase is time consuming and not easy.

The roles of central and local governments will be different when a rail firm uses a direct value capture method by building residential and commercial buildings around stations after it constructs a new rail line. As railway companies develop land and the city grows, local governments need to develop more infrastructures such as roads, police stations and schools.

A private rail firm has difficulties in developing around stations in urban center since it cannot purchase all the land around stations in the urban core. There will be many regulatory and commercial barriers for a rail firm to develop around stations in the urban center, although it will be much easier for a rail company to purchase all the land around stations when it constructs a new urban railway line in a suburban area. In fact, a railway company does not need to purchase all the land around stations. It can utilize land readjustment projects and urban redevelopment projects for development. Recently in Japan, companies have made space with some new methods, such as transferable development rights, building artificial grounds and so on. Of course, it takes time to get the consensus of various stakeholders.

The government can impose a tax or fee to absorb the increase of property value created by transport investments. Although there are fixed asset taxes and city planning tax, these taxes are imposed on a relatively broad area, and the relation between beneficiaries and payers are not exactly matched.

Many problems can arise from the perspective of the whole society,

city development, and the integration of transport systems when a private rail firm develops around stations only for profitability. Usually, railway companies need to work for corporate social responsibility (CSR). Though profitability is important, they also should consider other factors such as reputation and influence to related businesses like department stores. Thus, they are in accordance with the government and local society to some extent, but they basically decide on investments based on market economy.

3. Utilization of Public Private Partnerships (PPP)

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Due to a significant lack of financial resources in ASEAN megacities, PPP is another effective way to construct and operate public transit systems such as urban railways, bus rapid transit (BRT) and buses. Most of these megacities have been experiencing an increase in demand for public transit. This means that a private company can make a profit with the increasing demands from rapid urbanization. In this favorable public transit market situation, ASEAN megacities can successfully provide public transit services to fulfill the transport needs of citizens without government subsidies.

It is highly possible for ASEAN megacities to have a fancy dream that PPP itself will work smoothly. However, these megacities should avoid the pitfalls of PPP that other countries have experienced and they need to learn precious policy lessons from the PPP failures of other countries. In fact, PPP does not work automatically without continuous efforts by the government side, since the government has to work with private partners who look for maximizing private rather than public interest. In particular, PPP should be combined with value capture methods if it is to be sustainable.

3.1 Background of PPP

The Korean government introduced PPP by enacting the "Act of Promotion for Private Investment on Infrastructure Facilities" in 1994. However, due to a lack of PPP experience by the Korean government and the economic crisis in 1997, the law did not produce the expected results. In 1999, the government newly enacted the "Act of Private Investment in Social Overhead Capital" to expand infrastructure investments by reforming the previous act. The new act included a minimum revenue guarantee (MRG)

clause to attract domestic and foreign capitals aggressively.

In 2005, the "Act of Private Investment in Social Overhead Capital" was changed to the "Act of Private Investment in Social Infrastructure." This change allowed the government to utilize PPP for education, defense, health care and other social necessities.

In addition, the government makes an annual plan called the "Basic Plan of PPP Projects" to promote the development of land, industry competition, and convenience for the nation. In addition, the government enacted a "Light Railway PPP Project Management Guideline" to reduce the problems of PPP and to increase the efficiency of LRT projects.

The government proposed the guideline to make the LRT PPP process more transparent and efficient. It includes enforcement standards, investment organizations, operations, local government and related organizations' roles and the PPP process. According to the guideline, a small city whose population is less than 0.7 million cannot use the PPP system for constructing and operating LRT.

3.2 Content of PPP

In a PPP arrangement, a private firm(s) constructs infrastructure with a public subsidy, such as the cost of land acquisition, and operates it to provide public services for people on behalf of the government. The private sector recoups its construction investments and operation costs by directly charging end users and taking profits from incidental projects. Korea introduced PPP programs with the enactment of the "Act on Promotion of Private Capital into Social Overhead Capital Investment" in 1994.

There are four types of PPP in Korea: build-transfer-operate (BTO), build-transfer-lease (BTL), build-own-transfer (BOT), and build-own-operate (BOO). BTO is a kind of PPP arrangement in which a private company, for example, finishes constructing transport infrastructure or a facility and transfers the ownership of it to a central or local government. Afterwards, the private company has an operation right to the infrastructure or the facility for a certain period of time that allows it to retrieve its investment by collecting fares or tolls. BTL is another PPP arrangement that was "introduced in 2005 as a way private investment funds construct social infrastructures, the ownership of such facilities are owned by either central or local governments. Afterwards, the facility management operating rights are given to private operators during the

operating period (10-30 years), which private operators acknowledged and leased to the governments. In turn, the governments should pay the rent at the cost." (Park and Mun, 2013, p.21) BOT is a PPP arrangement in which a company, for example, builds a transport facility and operates it under the ownership of the company. After it operates it for a certain period of time that allows it to retrieve its investment by collecting fares or fees, it transfers the ownership to the government. BOO is another PPP arrangement in which a company, for example, builds a facility and has the ownership of it. Simultaneously, it operates it to retrieve its investment by collecting fares or tolls. In Korea, the most popular types of PPP are BTO and BTL.

3.3 Procedures of PPP in Korea

PPP should follow different procedures by whom proposed a PPP project. This can be divided into two types: government-initiated projects and projects proposed by private companies.

3.3.1 Procedures of Government-Initiated Projects

Government-initiated projects follow these steps: Specification of a target project, request of a project plan, submission of a project plan, evaluation of the project proposal, agreement of contract, approval of an implementation plan, and completion of implementation plan.

The first step of a PPP proposed by the government is to specify the target project. "If the project, whose costs are more than 50 billion Korean won (about US$50 million) and its project of the treasury is supported by more than 30 billion Korean won, is promoted as a PPP project, the competent authorities should apply a pre-feasibility study. The Minister of Strategy and Finance who received the results of the pre-feasibility study should seek comments on which project type, public-financed project, or any manner of PPP projects, is better and valid in the pre-feasibility study commissioned by the specialized agencies." (Park and Moon, 2013, p.23).

Before specifying a certain PPP project, the government should conduct a feasibility study commissioned by professional bodies. In the case that its validity is ensured, the government should decide whether the PPP project is more valid than a public-financed project, executing a comparative study of one alternative driven by the government and another one by PPP. While

making a choice, the government should make a judgment using both quantitative and qualitative analyses. When the eligibility of the PPP project is ensured, a financial analysis that includes the calculation of expenses, royalties and government financial aid should be presented.

The second step of PPP is to establish and announce the project plan. A "facility project means a project proposal to request from the private sector project proposals or the participation of bids. The competent authorities should announce a facility project basic plan for at least 90 days to let the private sector create and submit project proposals." (Park and Mun, 2013, p.24) The basic facility project plan should include the following information:

- Qualifications of the concessionaire (capital requirements, the company's largest investor and high-founder of ownership, the company's type)
- Performance requirements, such as specific performance levels of the facilities to meet the standards of those facilities and the quality of service
- Choosing and canceling the bidder
- Requirements for bid bonds, and project performance guarantees to ensure the implementation of the contents
- Submission formats of project plans and deadlines
- Determining and Specifying the concessionaire in the case of one single bidder negotiation deadline and the concession agreement deadline to sign
- Details about the proposed changes for a basic facility project plan.

The third step of PPP is to receive the project plans submitted by private companies. A private party that wants to participate in a PPP project should submit a project proposal based on the guidelines of the basic facilities project plan announced by the government. In the project proposal, the following information should be included:

- Organization of the concessionaire
- Plans to purchase the facility land
- Application of technology during the construction
- Letter from the investment founders of the expected incorporation, letter of loan intent, loan letter of commitment or conditional loan letter of commitment issued by a bank or financial companies,

warranty letter of intent issued by industry-based credit guarantee fund, etc.

The fourth step of PPP is to review and evaluate the project proposals. "The project applicant must meet the necessary qualifications or skills in the eligibility pre-screening, or if there is no eligibility pre-screening, the applicant should include project eligibility requirements in the basic plan. The evaluation elements of the project plan are mainly composed of technical and price elements that should not overlap or conflict with one another. The price element should be converted to the same condition as other price factors, such as total project cost, yield, demand, fees, operating expenses, and financial subsidies, and then be evaluated by focusing on the elements that could lead to price competition."(Park and Mun, 2013, pp.25-26).

The fifth step of PPP is to specify the concession and concession agreement. The government designates a project operator by signing a concession agreement that includes the private partner with the conditions of project implementation.

The main contents of the concession agreement are as follows:

- Designation of the concessionaire, the use and operation of the facilities, the administration period, the rights and obligations of the Parties to the Convention, the PPP project basics such as cancellation of the designated concession, and disposal for ordinance violations
- The processing basics of conducting the project such as the establishment of a corporation, implementation planning application, project performance guarantee and risk-related matters, and safety and environmental management
- Necessary measures, including the starting period of construction, undertaken construction period, construction supervision, and the imposition of compensation due to construction delays
- Total budget, determining and changing the fee, goals, target earning rate (after the tax earning rate, the shareholders' expected earning rate, in addition to the pre-tax project return, should be written), and other operating costs and incomes
- Support from a competent authority or relevant local governments that possess financial support standards and procedures: risk-taking investment support and licensing support
- Facilities maintenance, maintenance management, and operational

concerns
- Criteria of classifying dangers and risk-sharing principles
- Conditions and procedures for agreements' midway termination and termination payment standards and procedures due to termination
- Requirements and methods for appraised rights
- Other concerns related to agreement termination and handling procedures for disputes, etc.

The sixth step of PPP is to approve and complete the implementation plan. The private operator should submit the implementation plan's

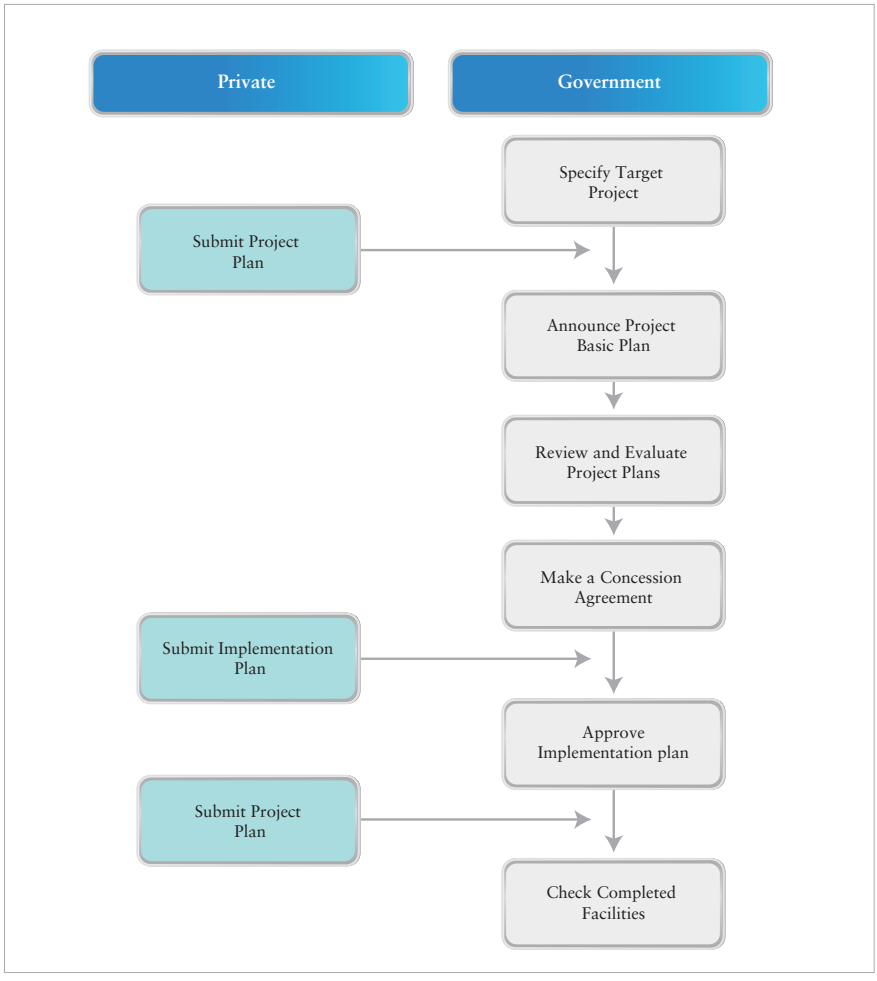

Figure 4.2 Procedures for implementing government BTO project

approval application to the government to obtain the approval of the plan. The government agency should try to shorten the duration of the implementation plan and embark on a basic investigation for an environmental impact assessment before designating a concession to speed up the implementation of the project. When the private partner completes the construction of the facility in accordance with the implementation plan, it needs to submit a construction completion report, and the government agency that takes charge of the project needs to verify the completion of construction.

3.3.2 Procedures of Private Sector's Proposed Projects

The private sector's proposed projects follow these procedures: Submission of a proposal, evaluation of the proposal by the government, announcement of the result of the evaluation, announcement of the proposal details (if the proposal is accepted), review of alternative proposals, choice of the proposer as a negotiator, designation of a project operator, approval of implementation plan, and completion of the plan.

A project proposed by the private sector has different steps to follow. The first step is to submit a PPP project proposal to the government so that the government can designate it as an official PPP project. The proposed project is promoted as a profitable project, and the first proposer of the project is critical because a third party cannot propose the same project as soon as the project proposal has been officially received and adopted by the government. After the government adopts the proposal, it makes the proposal public so that the first proposer's new idea can be protected from a third party.

The second step is for the government to review and evaluate the private proposal. "Once a project proposal has been submitted, the competent administrative agency will consult and consider if the development proposal corresponds to financial conditions. Then, if the proposal contains all the formal conditions and is suited to the competent administrative agency's policy, it should ask consideration to the PIMAC. An eligibility investigation and propriety of demand estimation should be approached based on a cost/benefit analysis for a project that has a total cost of more than 2 billion Korean won. For those projects with a cost of less than 2 billion won, an eligibility investigation is applied as a rule, but can be simplified considering the nature and time of the project." (Park and Mun, 2013, p.33)

The third step is to announce the results of the evaluation and the proposal in detail if it is accepted by the government. If the government decides to continue the proposed project as an official PPP project, it gives

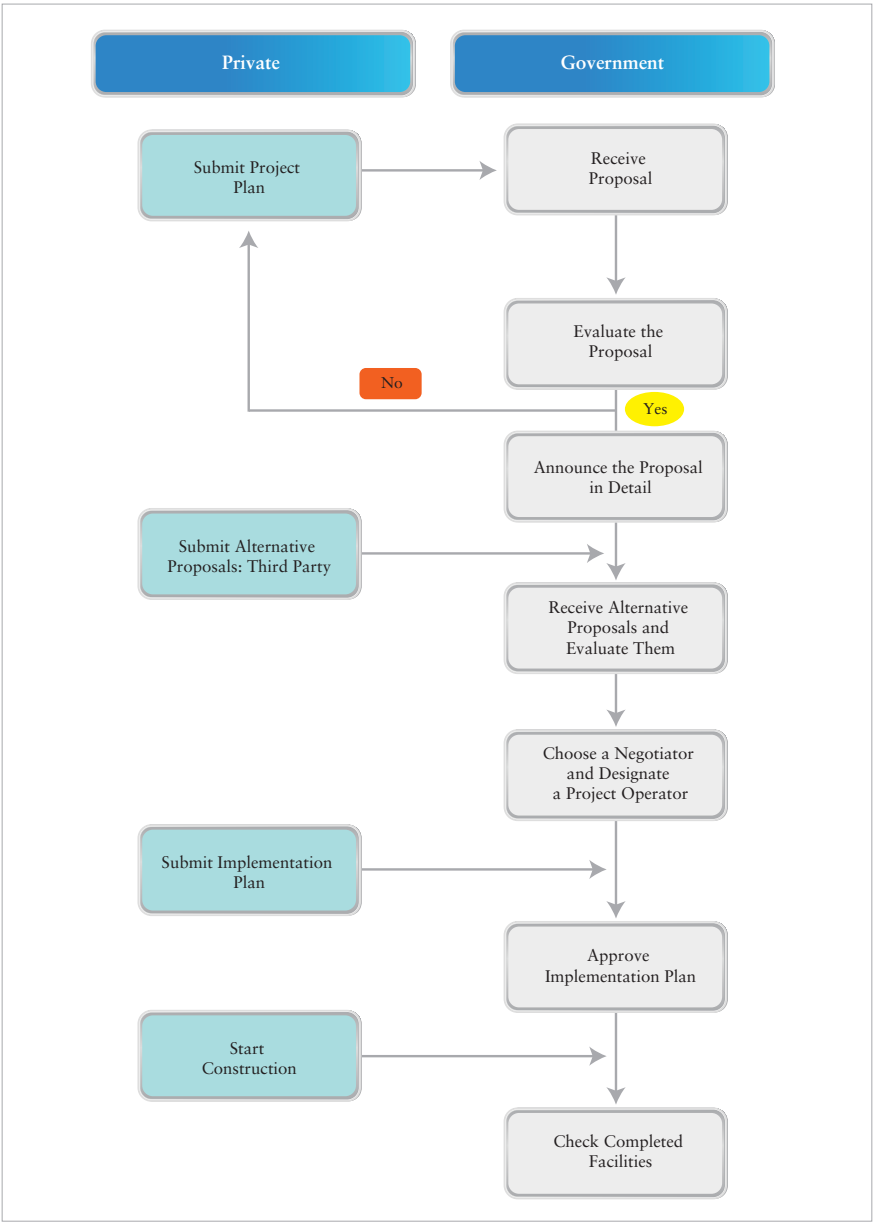

Figure 4.3 Procedure for implementing BTO project proposed by the private sector

a notice to the proposer and also gives an opportunity to a third party to submit an alternative proposal for the same project. The government receives the third party's alternative proposal and evaluates them on the same conditions as the first proposal.

The fourth step is to review alternative proposals if a third party has made a proposal on the same project. If there are proposals submitted by a third party, the government should evaluate the alternative proposals and the first one to decide on a negotiator. As long as no special reasons are given, the government has to select and rank more than two proposers by the results of evaluation.

The fifth step is to choose a proposer as a negotiator and designate him/her as a project operator after detailed negotiations on the conditions of the project's implementation. The designated project operator applies for government approval of the implementation plan, which includes working designs.

The sixth step is for the government to approve the implementation plan of the designated project operator within three months, and then the private operator starts construction of the project.

The seventh step is to complete the plan by the private proposer for future operations and to check up on the completed infrastructure and facilities by the government agency. The private operator should submit a construction completion report, and the government agency has to verify the completion of the construction and whether it follows the implementation plan fully.

3.4 Policy Implications

In the case of Korea, the government adopted a PPP system for local governments so that they can minimize financial responsibility by transferring it to private investors who rely on fare revenue. With the PPP system, the central government pays 60% of construction costs by subsidies, and local governments and private investors take charge of the remaining 40%. But huge debts for local governments remain from minimum revenue guarantee (MRG) contracts, because LRT does not produce the expected demands. It seems very difficult to provide LRT services by fare revenue alone, because there is a vicious cycle of accumulated debts for local governments, which suffer from a lack of financial resources.

Through PPPs, local governments are trying to minimize their financial

Table 4.8 Huge LRT PPT debts in Korea

LRT	Content
Kimhae LRT	• Opened in September 2011 • Busan and Kimhae City have to pay about US$2.9 billion in subsidies to a private rail firm for 20 years • 23.57 km • Rotem AGT, Iron Wheel • Conflict between city and private rail firm • Huge burdens on city
Yongin LRT	• Opened in April 2013 • Yongin City has to pay about US$560 million in subsidies to Yongin LRT company for 30 years after its operation • 18.14 km • LIM AGT (Bombardier) • Conflict between Yongin City and private rail firm • Huge burdens on city
Uijeongbu LRT	• Opened in July 2012 • Uijeongbu LRT company faced bankruptcy because of a lack of demand • 11.09 km • Rubber-Wheel AGT (Val 208) • Conflict between city and private rail firm

responsibility for constructing urban railways by transferring it to private investors who rely on fare revenues. Due to MRG contracts with private investors, however, local governments have to take on huge financial burdens because LRT does not produce the expected demand. To attract more private investors, the Korean government in 1999 reduced the private participant's risk in demand forecasting by guaranteeing minimum revenue based on a certain level, such as 90%, of forecast demand. In Korea, due to the existence of the MRG system, even though tariffs in the case of BTO are much higher than those of public operators, the government still has to pay large amounts of guaranteed revenue. The increasing burden on local governments from PPP caused the Korean government to cancel the MRG system in 2009.

PPP in Korea has three main problems. The first one is lack of administrative capability by local governments. Local governments that adopt PPP to construct transportation infrastructure or facilities need to have administrative capability to handle contracting, management, monitoring, and performance management, since local governments have to deal with a private company. The second problem is the overestimation of transport demand. Due to the MRG system, local governments take the risk

Figure 4.4 Uijeongbu LRT line in Korea

of transport demand forecasting. When the government provides an MRG to attract private investors, it should be very careful to forecast the future traffic demand that will be the standard of the MRG. The third one is that there is too much dependence on fare revenues to pay for both construction and operation costs. Due to the lack of traffic demand, a private company cannot retrieve its investment by collecting fares.

"PPP projects require the practical use of private capital and increasing financial efficiency to build SOC. Applying a PPP scheme to urban railway projects is to ease the financial burden toward infrastructure. PPP railway projects are assumed to be an advisable scheme for economic growth and efficiency improvement." (Park and Mun, 2013, p.104).

In particular, for ASEAN megacities, which are lacking in the financial resources for urban railway systems, a PPP project could be an effective alternative for providing urban railways. As we review the public transport cases of ASEAN megacities, they are actually using the PPP scheme to fund urban railways and BRT. This PPP strategy will work for the expansion of public transportation in ASEAN countries.

"Despite all the positive impacts, PPP railway projects need to be warned about, as was revealed in the case of Korea recently. Overestimation of passenger demand, lack of professionalism, changes in investment conditions, and MRG issues are things that need constant awareness. A successful project will only be available by understanding and managing all

these issues."(Park and Mun, 2013, p.104)

First of all, the government should improve the reliability of traffic demand forecasts for urban railway PPP projects. Due to the extremely low forecast of passenger demand on the Yongin LRT, Kimhae LRT, Uijeongbu LRT, and Incheon Airport railway, a negative image of railway PPP projects has spread out since financial burdens have occurred from huge MRG subsidies. Use of unreliable data and extensive reflection of uncertain urban development plans made an excessive estimation of passenger demand. "Also, the project agencies forced projects to proceed and used them as a political achievement. These things brought about a big gap between estimated and actual passenger demand, led to paying a big amount of MRG subsidies and eventually increased the financial burden of the government." (Park and Mun, 2013, p.105).

"It is hard for a developing country to produce reliable passenger demand estimation because of a lack of primary data and information. Therefore, countries need to establish an organization in which all the primary data and analysis is contained to develop reliable passenger demand estimation. In Korea, a national transport DB center was launched under the Korea Transport Institute and gathered all the necessary data for passenger demand estimation. It has proved its accuracy and reliability in a successful way. In the past, railway PPP projects used data and information before a national transport DB had been established. Because of this condition, the accuracy of passenger demand estimation was poorly managed and produced a financial burden for the government in the end." (Park and Mun, 2013, p.105). According to this point, I am going to propose another strategy for ASEAN countries: construction of transport database with DB center.

Korea operates a national passenger demands survey and constructs DB under the National Transport System Efficiency Act, and constantly focuses the improvement of data reliability. It is crucial for ASEAN countries to create a transport database center.

Second, the government is required to improve the administrative capability of the PPP project agency because both private and public sectors have conflicting goals in participating in PPP. The private sector's goal is to maximize profit, but the public sector's goal is to maximize public interest. The public agency needs to have contracting, financing and monitoring techniques for achieving public interest by using private self-interest motives. "If there is a lack of capacity for managing PPP projects by the implementing agency, capacity building is necessary for the public officials in charge to

increase understanding of railway PPP projects, and inviting external experts could be considered as a solution."(Park and Mun, 2013, p.107)

In addition to administrative capability, the government needs to have financial capability to successfully implement urban railway PPP projects. In particular, local governments whose financial resources do not meet the financial necessities of urban railway projects should not start a PPP project, since PPP requires local governments to provide for extra resources to manage the system. The success of PPP depends on the administrative and financial capability of local governments, so local governments also need to prepare an emergency plan for when a PPP project fails and the private company goes bankrupt.

Third, in ASEAN countries, it is better not to have an MRG system in the arrangement of PPP since it requires high capability to handle private partners to maximize public interest. "When a developing country starts a PPP, the country needs to approach the introduction of an MRG in a conservative way by looking at the case of Korea. Once an MRG is introduced, the failure of proper passenger demand estimation can place a huge financial burden on the government."(Park and Mun, 2013, p.107).

Fourth, a joint development method that combines PPP with value capture is strongly recommended for ASEAN megacities. For example, about 50% of the operation revenue of the Hong Kong MTRC comes from station area development. The government should allow the private sector to provide transport services with estate developments around stations. Since the government and private companies can develop land together to make a profit and develop more traffic demand, it will be best for the success of the PPP if the government allows the private partner to construct buildings and developments around stations and BRT stops.

Table 4.9 Combination of PPP and value capture

Classification	PPP with value capture
Target	• Urban railways • Land and buildings around stations of urban railways or stops of BRT corridors
Benefits	• Profits generated by development around urban railway stations or BRT stops can be used for construction costs • Rents from buildings by estate development around stations, along urban railway lines, or BRT corridors can be used for operation deficits
Method	• Land and estate PPP projects

The implementation methods of PPP for urban railways need to be

modified and focus on private operations rather than construction. In addition, PPP is required to increase the responsibility of local governments. To improve PPP, these goals should be achieved: creating successful PPP model projects, strengthening PPP institutions at all levels of government, streamlining the PPP process, proper project preparation to reduce unnecessary transaction costs, and providing government support for the success of the PPP. Two of the greatest strengths of the rational utilization of PPP are enhancing public-private partnerships and policy improvements for PPP. First, it can shift the government role to be a facilitator or enabler. And the private sector can focus on sustainability through efficient and effective investments more than the government or the public sector. Second, with the improved policy for PPP, it can create successful PPP model projects and strengthen PPP institutions at all levels of government. Furthermore, streamlining the PPP process, providing government support in the state budget, and proper project preparation to reduce unnecessary transaction costs are also major merits of PPP.

4. Improvement of Pedestrian Environment

Changhwan MO

ASEAN megacities have serious problems with the pedestrian environment. The poor condition of the walking environment does not allow citizens to easily use public transit. If this problem is not solved, it is really difficult to increase the use of public transit. This is the reason that the improvement of the pedestrian environment is proposed as a strategy to improve public transit in ASEAN megacities for low carbon and green growth.

The unfavorable condition of the pedestrian environment comes from illegal parking of motorcycles and cars on pedestrian roads. For example, in Hanoi, there are many motorcycles illegally parked on pedestrian roads. Citizens have to walk in the street to avoid motorcycles and other barriers, such as restaurant tables or goods on sidewalks. More importantly, many ASEAN megacities do not have adequate designs for pedestrian roads that can protect pedestrians from cars or motorcycles. In many cases, the sidewalks of these megacities do not provide comfortable walking space for pedestrians. In addition, most ASEAN megacities have auto-oriented road crossing facilities where pedestrians have to cross streets by using overpasses or underground passes.

4.1 Problems

We often find chaotic road conditions in ASEAN megacities. For example, there are no sidewalks, no crosswalks with adequate signs and signals, lots of illegal parking of motorcycles and cars, a lack of legal space for parking, and no road facilities to protect pedestrians from motorcycles and cars. Most of these megacities have problems such as auto-oriented road design standards, no requirements for sidewalks, and a lack of sidewalks and pedestrian spaces. Auto-oriented road policies cause all these problems. When there is a space, it is used for parking, because the rapid increase in car ownership worsens the

Figure 4.5 No proper walking connection from LRT in Manila
Source: Diaz. (2014).

shortage of parking spaces in the urban center. In addition, when roads are constructed, the safety of pedestrians is not fully considered in terms of road design and safety facilities. For example, roads where many small children are moving require low-speed pavement for safety.

4.2 Policy Direction

Since pedestrians have disadvantages against automobiles and motorcycles, it is a kind of welfare improvement to make the pedestrian environment better and safer. Many cities have adopted universal design and barrier-free design from the perspective of urban design to improve walkability. This new and progressive concept of design can be easily applied to new towns, but it is difficult to apply to old towns which have an auto-oriented transport system or are lack of walking space.

The universal design that originated in the United States is rapidly spreading in the transportation sector. The basic idea of this emerging trend is to design services, equipment and infrastructure that are accessible not just for those who use standard services, but for as much of the population as possible, and further to supplement this with specialized provisions for

those who need them.

To improve public transportation, it is required to improve the pedestrian environment. In particular, public transportation needs to be improved at urban railways stations and bus stops. To get better at walking condition for pedestrians, there should be enforcement on the illegal parking of motorcycles and cars on sidewalks, improvement of walking facilities, and implementation of walking-oriented policies such as school zones and pedestrian priority zones.

4.3 School Zone Program in Korea

This policy was originally adopted in 1995 under the Road and Traffic Act. The purpose of the policy is to protect children in and around schools from traffic accidents. A series of significant amendments were made in 2006. With regard to physical extension, the target facilities expand from elementary school to kindergarten. The areas of school zones extend within 200m from the school in every direction to within 300 m in every direction.

The head of the local police authority should immediately install pedestrian signals at the nearest crossing on an arterial road around the main entrance to an elementary school. To increase the visibility of

Figure 4.6 An example of school zone

Source: Jung et al. (2014).

Figure 4.7 Enforcing the speed limit within a school zone
Source: Jung et al. (2014).

the school zones, the authority is required to install signs, road surface painting, reflectors, bumps, and protective sidewalk rails.

The school zone program also strengthens for cement by lowering the speed limit within school zones to 30km/hour and doubling the fines for speeding violations. It also limits automobile use on any roads within school zones between 08:00~09:00 and 12:00~15:00 and bans on-street parking on roads directly connected to school entrances.

The effects of the school zone program are an increase in the number of school zones and decrease in the child fatality rate. The number of school zones was increased from 8,429 to 14,921, and the child fatality rate decreased significantly, from 2.3 fatalities per 100,000 children in 2007 to 1.3 fatalities[1] in 2011 (Jung et al., 2014).

4.4 Exclusive Areas for Public Transit

The goal of exclusive areas for public transit is to create friendly and attractive streets by making pedestrian barrier-free spaces and to build

1 The average of OECD was 1.4 fatalities in 2011.

dynamic and multipurpose road space to maximize the utilization of public transit. Private automobiles should not enter these areas and only buses or trams can enter these areas so that citizens easily use public transit and pedestrian spaces.

In Korea, there are several exclusive areas for public transit. The first example is Daegu's exclusive area for public transit. The area covers the cross section of the Daegu train station to that of Banwoldang, with a length of 1.05 km.After the Daegu City government designated the area for public transit, it changed the four-lane roads to two-lane roads for bus operation only and expanded the pedestrian road. The main effects were an increase in bus operation speed from 10.9 km/h to 25 km/h and an increase in convenience for pedestrians by the expansion of the pedestrian road from 2 to 4 meters to that of 12 meters with the construction of 17 benches and creation of a small stream (565 m).

Other cases are Busan's exclusive area for public transit and Shinchon's exclusive area for public transit in Seoul. The area of Busan City is 740 m long, and the city government reduced road lanes to make more bus lanes and pedestrian roads. The area of Shinchon is 550m long, and the Seoul City government expanded the pedestrian road. The effects were the reduction of traffic accidents by 34.5% and an increase of the pedestrian satisfaction rate.

Figure 4.8 Exclusive area for public transit in Daegu

Figure 4.9 Exclusive area for public transit in Shinchon, Seoul

4.5 Walking Priority Area

A walking priority area is an area where pedestrians have a priority over other modes such as private automobiles and buses. It provides a comfortable and safe walking environment for pedestrians. The government publishes a manual of standard design for walking priority areas that includes planning, investigation, design, and conflict resolution. The manual also provides design standards for pedestrian roads, speed reduction facilities, crosswalks, traffic guidance facilities, and safety facilities. The government pursues the priority of walking over the mobility of automobiles.

According to the "Act of Mobility Improvement for the Transportation Disadvantaged," the government is required to make a barrier-free pedestrian environment. The basic direction for the barrier-free system is to remove barriers on pedestrian streets and to consider the movement route

Figure 4.10 Walking priority area in Seoguipo, Jeju

of the transport disadvantaged. The details of the strategy are to improve the pedestrian environment, to construct pedestrian priority areas, and to establish a barrier-free certification system.

4.6 Complete Streets

A complete street refers to a street where people, such as pedestrians, cyclists, public transit passengers and automobile drivers, can safely use it all together. Examples are entrance and exit improvement considering the safety of pedestrians and cyclists, intersection design improvement considering the forward movement of cyclists and pedestrians, crossing design improvement for pedestrians and cyclists, and design improvement of bus stations for pedestrians and cyclists.

The purpose of the complete streets is the guarantee of safety rights as a basic right of citizens, provision of fair welfare transport services for citizens, guarantee of transport rights to the transport disadvantaged, and improvement of quality of life by increasing welfare transport. The necessity of complete streets are the application of methods and planning of complete streets adapted to the Korean situation, introduction of complete streets considering the transport disadvantaged, systematic implementation of projects for the improvement of walking rights, and the reduction of social costs of victims of traffic accidents and the transport disadvantaged.

A sample case of complete streets in Korea is Cheongju City. The city government reduced four-lane roads to two lanes and constructed bike and pedestrian roads separately. It also created cozy parks by utilizing

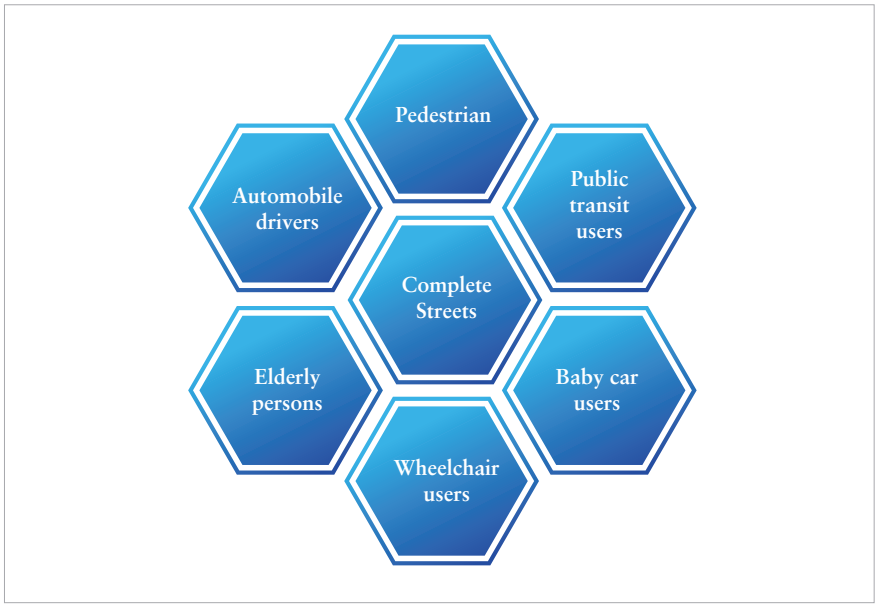

Figure 4.11 *Concept of complete streets*

Figure 4.12 *Complete streets in the city of Cheongju, Korea*

Source: <http://news.naver.com/main/read.nhn?mode=LSD&mid=sec&sid1=102&oid=015&aid=0002818783> (Accessed on 8 August 2014).

small spaces left over along the roads. The city completely prohibits illegal parking and constructed S-shaped roads to induce drivers to slow their driving speed.

4.7 Walking Environment Improvement Area

There is increasing necessity to construct a safe, convenient and comfortable walking environment at pedestrian concentration areas, such as tourist places and historical sites in cities. The vision of walking environment improvement is to construct a human-oriented and walking friendly area.

The purpose of the walking environment improvement area is to make safe and comfortable walking spaces and to implement walking facilities through area designation and management. When a walking environment improvement area is designated, measures such as the restriction of automobile use and elimination of walking barriers and risk factors should be imposed. In addition, the government is required to improve the convenience of transport disadvantaged persons and to make area-specific developments for the walking environment and scenic views.

The government designates these areas as walking environment improvement areas: areas with a large volume of pedestrian trips; areas with a high frequency of trips by the transport disadvantaged, such as elderly persons, pregnant women, and disabled persons; historical districts with tradition and culture; and areas where the walking environment specifically needs to be improved. The cases in Korea are the Gui riverside area, the Yongsan global food cultural street, the Seongbuk culture and history district, the Myeongdong walking environment improvement area, and the DDP walking improvement area.

4.8 Construction of Road Facilities for Pedestrians

Traffic calming limits the speed of motor vehicle traffic to 30 km per hour

Figure 4.13 Traffic calming technique

(19 mph) or less both by law and through physical barriers such as raised intersections and crosswalks, traffic circles, road narrowing, zigzag routes, curves, speed bumps, and artificial dead ends created by midblock street closures. The construction of crossing islands in the middle of wide roads can improve safety for pedestrians since they can easily cross two times. These physical barriers and designs significantly increase the safety of pedestrians.

4.9 Improvement Measures for Traffic Safety Regulations

Automobile-oriented traffic safety laws are the main issue for the pedestrian environment since the laws support the free flow of automobiles on roads that are against pedestrian rights on roads. If ASEAN megacities want to have a favorable transport environment for pedestrians, they need to improve traffic safety regulations based on a human-oriented philosophy. ASEAN countries can learn policy lessons from the Korean experience, where the "Act of Mobility Improvement for the Transportation Disadvantaged" was enacted in 2005.

The Korean congress made a legal foundation to improve the mobility of transportation disadvantaged persons such as the disabled, the elderly, pregnant women, persons with babies and children. The purpose of the Act is to make a barrier-free society so that the transportation disadvantaged can move freely to lead their lives as others do. According to this law, central and local governments implement walking priority areas for pedestrians.

ASEAN megacities can improve their safety regulations by following these measures. It is required to reduce driving speed to 30 km/h on residential area roads and to increase penalties for those who violate the speed limit. It is also required to change the regulation of sidewalks so that the government can construct them when they construct various kinds of roads. It is also desirable to expand the number of walking priority area projects by increasing subsidies with expert consultation from the central government. To protect walking rights, it is necessary to increase penalties for illegal parking around crosswalks, which can cause a high risk of pedestrian accidents, since the illegally parked cars block pedestrians from acquiring clear visibility of oncoming automobiles. It is also necessary to expand the area limit of school zones to 500m from the gates of schools.

Traffic regulations in Germany and the Netherlands strongly favor

pedestrians and bicyclists. Even in cases where accidents result from illegal moves by pedestrians or cyclists, the motorist is almost always found to be at least partly at fault. When an accident involves children or the elderly, the motorist is usually found to be entirely at fault. In almost every case, the police and the courts find that motorists should anticipate unsafe and illegal walking and cycling. In Germany and the Netherlands, not stopping for pedestrians at crosswalks is considered a serious offense and motorists can get ticketed for noncompliance, even if pedestrians are only waiting at the curb and not actually in the crosswalk. (Pucher and Dijkstra, 2003).

The best welfare provided by the government is to guarantee the safety of citizens. Therefore, the ASEAN governments should pay more attention to protecting the rights of transport disadvantaged persons, such as pedestrians, disabled persons, children, pregnant women and elderly people. If the central governments revise laws and provide more support for local governments, pedestrian accidents will be drastically reduced in the future.

5. Reform of Bus System

Changhwan MO

At the starting stage of public transport development in a city like Phnom Penh, an improvement strategy for ordinary buses is most essential. The introduction of urban railways is a distant future issue, and even some time is needed even to introduce BRT in that city. Phnom Penh definitely requires development of a reliable and efficient bus system.

As I have visited many cities in ASEAN countries, more importantly, I have found that most ASEAN megacities need to improve their bus systems. Hanoi also needs to create a reliable bus system for the development of a public transit system with the construction of urban railways or BRT. Brunei also has a lot of room for improvement of its bus system for citizens and foreign workers. Bangkok and Manila also need to improve their bus systems so that they can have harmony in their public transit systems. The bus systems should become a healthy base for the whole urban transport system.

Phnom Penh has had a very weak history of public transport development since it suffered a lot from political oppression, such as the Khmer Rouge, an extreme leftist experiment in Cambodia during the 1970s. The Khmer Rouge regime totally destroyed the capital city and made it a ghost city until it fell in 1979. Due to this negative experience in government, the Cambodian people seem not to believe in public transport, but rather trust private modes, such as motorcycles and private cars.

The city has just started operation of 10 medium-sized buses in February, 2014. Without them, the capital city would not have any public transport system for about one million citizens. Citizens mainly depend on walking, motorcycles and tuk-tuks for their mobility needs. The city government has been running buses since April, 2014 after a Chinese firm, Global (Cambodia) Trade Development, which was given the operating contract for the bus line, pulled out after being refused tax breaks for its metered-taxi business. The fares will range from 1,500 to 1,600 riel (about US$0.37

Figure 4.14 *City bus in Phnom Penh*

to US$0.40) for retail tickets, and the elderly will be given 50% discounts on ticket prices.

Recently, the number of private cars has been increasing and traffic congestion has worsened on several main trunk roads in the city. About 300,000 cars and one million motorbikes now accelerate traffic jams in the city's streets. The Phnom Penh city government is trying to improve public transport by providing more bus services. This year, the city government will run 40 more buses on two new bus lines. In that case, the total number of buses will be 50, and the total bus lines will be three by the end of 2014. Without a private company partner, the government plans on creating an autonomous transport authority that will run the current bus line and the two others being planned.

In the case of Bangkok, it does not have a hierarchical harmony in its public transport system since it mixes old and modern transport modes. Motorcycles and tuk-tuks are widely used, and buses provide low-level service, while the Skytrain and subway systems provide high-quality public transport services for citizens. Bangkok also operates a high-level BRT line as an experimental project.

Bangkok has implemented a car-oriented and road-based transport policy because the city has many elevated roads and pedestrian overpasses on streets. Pedestrians are not properly protected from automobiles, and pedestrian rights have not been secured at crosswalks and pedestrian roads. In addition, bus stations are not adequately furnished for the convenient

Figure 4.15 Traffic Congestion in Bangkok

use of bus passengers. The Thailand and Bangkok city government seems to have a keen interest in expanding urban rail systems such as subway and LRT. But I think that the priority should be also put on the reform of the bus system with the expansion of urban railway systems.

In the case of Hanoi, recent improvements to the quality and capacity of the bus system have been a major success, but the efficiency of operation is

not sufficient because the improvement of services and introduction of new services are more and more inhibited by illegal parking, traffic congestion and operating conditions. The Hanoi authorities are seeking to improve bus operations through bus priority to improve operational efficiency, ensure the effective use of the fleet and provide better service as an attractive alternative to private transport.

5.1 Bus Reform

To reform the bus system, ASEAN megacities need improve bus operations, facilities, vehicles, and culture. Bus stations and lanes should be repaired and substituted with exclusive lanes for a better environment for bus users. Old vehicles also need to replace with high-quality buses such as double-decker buses, electricity buses, and online electricity vehicles (OLEVs). The government should manage private bus companies with performance and service evaluation systems, and ASEAN megacities generally need to use private bus companies to provide bus services.

Accordingly, ASEAN megacities should have a high level of monitoring and enforcement systems for bus operation companies. In addition, a standard cost system needs to be built for the efficiency of bus companies. Finally, ASEAN megacities need to create a sustainable business model for private bus operations. The model should utilize the profit maximization motive of the private sector by relying on a free market system with limited public support. Thus, ASEAN megacities should try commercial approaches to meet the needs of citizens so that they can make it possible to be less dependent on government subsidies in providing bus services.

Table 4.10 Improvement of bus services

Classification	Content
Improvement measures	• Increase in monitoring and enforcement for bus operation industry • Service and management evaluation system • Limitation system of old buses: nine years at maximum • Route reform based on trunk- and feeder-oriented routes • Standard cost system and bus fare regulations • Integration fare system between buses and other transport modes

5.2 Bus System in Korea

Due to a rapid increase in private passenger cars, city bus demand has gradually decreased since the 1990s. Because of competition from other transport modes such as private passenger cars and urban railways, it is prospected that demand for city buses will continuously decrease. Additionally, local areas such as farming and fishing villages are seeing a sharp fall in bus transport demand. The future prospects for buses will be a decrease in the modal split for buses as automobile use increases. In 2005, the modal split for buses was 26.8%, but only about 10% is expected for 2030.

Before 2004, most bus services were provided by private bus companies without government subsidies. However, the bus industry has faced a significant drop in bus traffic demand until 2003, and has experienced financial difficulties due to a lack of revenue. The vision of the bus policy will be an expansion of the role of buses that can reverse the trend of decreasing bus passengers. In order to revitalize the bus industry, sustainable policies for low carbon and green growth are necessary because they can increase the modal split for buses. The strategy to realize this vision is not only to improve facilities and vehicles, but also to change operation systems. Since 2004, the Seoul city government has intervened in the bus market to provide reliable services for citizens by changing the bus operation system from a purely private one to a quasi-public one.

Table 4.11 City bus demand trends

Year	1999	2003	2008	Annual rate of increase (%)
Number of city bus vehicles	23,229	29,441	30,732	3.16
Number of transported (persons)	5,337,251,941	4,408,603,971	4,768,437,373	-1.2
Number of city bus companies	251	321	336	3.3

Large cities such as Seoul started a quasi-public bus operation in 2004, then Daejon, Daegu, Gwangju, Busan, and Incheon followed the same operation system to provide bus services. The quasi-public bus system seems to bring an increase in bus demand and a potential stoppage of the decreasing trend in bus demand in large cities, as we can see an increase in the number of bus passengers from 2003 to 2008. There are positive impacts of quasi-public bus operations on bus demand. Statistical evidence shows a 3.8% decrease in bus use from 1998 to 2003, but a 1.6% increase

from 2003 to 2008.

In terms of quasi-public bus operations, city governments provide the entire subsidy for private bus companies for operation deficits with the public control of operations. City governments can partially control the operations of bus routes that are owned by private bus companies.

In most medium and small cities in Korea, however, private bus companies still provide bus services with partial subsidies from local governments. It is important to emphasize that the private bus companies have the ownership of bus routes. The major problems with this private bus operation system are long and winding routes, nonstop operation at a few bus stops, violent driving, irregular frequency and low quality of bus services, labor strikes, and so on. Private bus companies compete against each other to take more passengers at concentrated bus stops and attempt to minimize costs and maximize fare revenues.

5.3 Reform of Bus Operation System

There are several operating systems for buses: private, public, and private-public partnerships. A private-public partnership can be classified into route tendering systems, quasi-public bus systems, and contracting out.

The private system is the most efficient, since the government does not provide any subsidy for private bus companies. To maximize profits, a private bus company does its best to provide better services so that they can win in competition against other bus companies. The government does not need to provide any subsidy for the operation of private bus companies. But private bus operations produce several problems. For example, many private bus routes are highly circuitous, overlapping and not adequately integrated with other public transit networks. In addition, bus drivers frequently skip bus stops, recklessly race with other buses to pick up passengers, and deliberately avoid picking up elderly and disabled passengers.

The public bus system is the most reliable to provide bus services for citizens. But public corporations may cause inefficiency in operations, and the government has to pay subsidies to bus operators. In other words, a public system is costly but it can probably provide trusty services for citizens.

A quasi-public bus system is a kind of public-private partnership. The characteristics of a quasi-public bus system are operation of private bus

companies, provision of subsidies for deficits, and route management by local governments. The key factors of a quasi-public bus system are an agreement between local governments and companies, standard operating costs, revenue control, route adjustment through negotiations, and service evaluation and management evaluation systems. The problems with this bus operating system are a continuous increase in subsidies, lack of efficiency, and lack of administrative capability. The continuous increase of subsidies, guarantee of subsidies for deficits, lack of efficiency and moral hazards are major problems. Also, issues of enforcement and administrative capability in service and management evaluation systems create a lack of effectiveness as well.

The policy directions are the improvement of bus management and bus services and utilization of the creativity of private companies. To reform the bus operating system, a competitive tendering system can be considered as a public-private partnership. Furthermore, a quasi-public bus system requires high administrative capability to manage and control private companies.

5.4 Bus Reform in Seoul

In July 2004, the Seoul City Government implemented a comprehensive reform to improve its public transit system, particularly the bus system. The reform measures address different aspects of the transit system: a quasi-public operation was established, with a tendering scheme to contract out route operation; all bus services were restructured in a functional hierarchy of four groups; a distance-based fare system was introduced to allow free transfers between different modes of public transit, with the aid of a new transportation card system; a Bus Management System (BMS) was set up to provide real-time information on bus operations and to help improve operation efficiency; and exclusive median bus lanes were constructed for express bus services. Among the transit reform measures of Seoul, the subsidy payment mechanism of a quasi-public bus system was the backbone to allow the Seoul bus reform to be successful.

As one of the most important transport modes, buses have been working a great role in various cities in Korea for the last 40 years, but the number of bus passengers in most cities has gradually decreased with the rapid increase of private passenger cars. This phenomenon resulted in an unstable provision of bus services for citizens. Private bus companies lowered the level of bus services so that they could maximize their profits. Accordingly,

the harder it was for bus passengers to use buses, the quicker they were changing from buses to private passenger cars. To counteract this vicious cycle for the private bus system in Korea, the Seoul City Government radically reformed the operation system of buses in 2004 by changing the private bus system into a quasi-public bus system.

According to this system, the local government has to provide a financial subsidy for private bus companies based on the mileage (vehicle/km) of those companies' operations. The local government regained the authority to control and change bus lines for the benefit of citizens. Under the private bus system, the government does not have the administrative power to change bus routes for the public benefit of citizens because private bus companies own bus lines as private property. Like Seoul, other cities such as Busan, Daejeon, Daegu, Incheon and Gwangju have also introduced the quasi-public bus system in order to improve the level of bus services and secure the reliable provision of bus services.

Government subsidies to the bus transportation industry have been introduced to compensate for the market failure of the businesses. With competition among companies to maximize profits in business, seeking to operate only on profitable routes, the "availability-to-use" has gradually decreased. The lowering of the rate of bus transport passengers due to the increase of private passenger cars, and the subsequent profit loss, also led to decreasing service in general. In the case of Seoul, the subsidies provided to private operators are aimed to compensate for such losses and maintain service availability and quality, taking into consideration the characteristics of bus transportation as a part of public services, as it increases general social welfare as a result.

Subsidies are given aiming for the following social benefits. First, the mass transportation service bears in its nature the characteristics of a public good, as it includes the necessity to offer service regardless of profitability. For example, the government creates new bus routes to connect remote areas or newly established towns for the benefit of the citizens. Second, in modern society, the provision of mass transportation services by the government is mandatory, as it is perceived as a basic right of the citizens. The costs for improving a transportation system for better use by the poor, handicapped and disabled are believed to save costs at the society level, in comparison with the costs that individual provision of transportation might incur. The provision of subsidies is therefore a well-sustained and reasonable means to obtain such political support from transport-vulnerable people. Third, the improvement of bus transportation

is expected to absorb private car users into the system, thus saving energy and waste. Fourth, subsidies for transportation have the effect of lowering the cost of living, as this decreases the level of transportation fares paid by individual citizen compared with when subsidies are not provided. Generally speaking, the demand for bus transportation services is much higher in the low-income class than the middle and upper classes, which can afford an automobile or take a taxi.

The major characteristics of the bus operation system in Seoul consist of the utilization of both the selection of contractors by competitive bidding for certain main bus routes and a revenue common management system for the rest of the routes.

The city government calls for bids to select bus companies that can operate 10 main routes in city areas over six years. The rest of the companies operate routes that can be adjusted according to situational necessities. All the revenue generated within this system is managed in a single revenue management account. The government has the partial power to adjust bus routes, and the bus companies can obtain compensation for losses from the operation of non-profitable routes.

The Seoul City Government pays a subsidy for operation deficits to

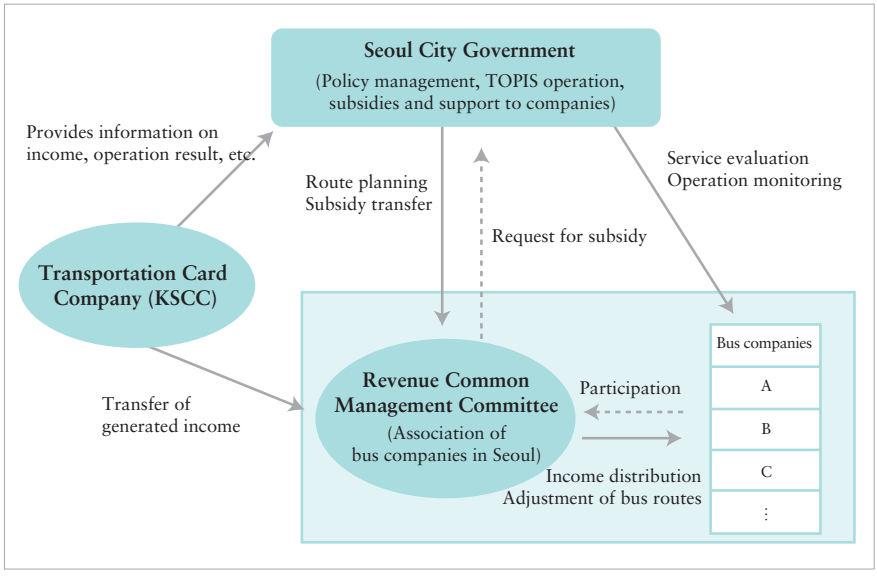

Figure 4.16 Payment mechanism of quasi-public bus operation system

Source: Mo, Changhwan (2012). "Quasi-Public System of Bus Operation." *Lessons from Transition in Urban Transport Policy*. Goyang, Korea: The Korea Transport Institute. 2009. p. 104.

bus companies so that they can keep supplying stable bus services for citizens. Between the Seoul City Government and bus companies, both the Committee for Revenue Common Management and Smart Card Company play a critical role in making the quasi-public bus system function properly. Whenever necessary, functional officers from the city government, transportation card company, and the association of bus companies can meet to discuss issues related to the calculation of due payments.

The quasi-public bus system has brought various positive effects, such as an increase in bus passengers, the efficient change of bus routes, a decrease in bus accidents, and an increase in bus users' satisfaction, although local governments have to increase the amount of subsidies for private bus companies. In particular, the new bus operation system has increased the stability of bus provision for bus passengers who are mostly captive users.

Table 4.12 Trend of bus passengers transported before and after quasi-public bus system

(Unit: 1,000 trips/ day)

Classification	Before	After	Change (%)
	July 2003-June 2004	July 2004-June 2005	
Bus passengers transported in Seoul	4,809	5,280	9.8

Source: Mo et al. (2009).

In Seoul, the change of the bus operation system in 2004 brought about an increase of bus passengers from 4,809,000 trips per day to 5,280,000 trips per day. The increase of bus ridership should not be accepted as a pure increase of ridership, because transfers also increased after the introduction of an integrated transfer discount system. But the bus reform, not the change of bus operating system, has reversed the previous declining trend of bus ridership in Seoul (Mo, 2009).

At the same time, the introduction of the quasi-public bus operation system seems to have had an effect in decreasing accidents. Bus companies are more likely to keep stricter traffic regulations, as the city government monitors their services, including the safety of passengers, with expectations of stable revenue from the operation system.

In Seoul, bus accidents decreased by 49% in 2008 compared to 2003, prior to the implementation of the quasi-public system. The shaded area in the table represents the period of the quasi-public bus operation system that was implemented after 2004. In addition, bus passengers showed high

satisfaction with services after the introduction of the system. According to a survey, the satisfaction of bus users increased from 22.4% to 30.4%, while the dissatisfaction of bus users decreased from 41.8% to 17.5% (Mo et al, 2009).

Table 4.13 Trend of bus accidents in Seoul (Unit: cases)

Year	Seoul
2002	8,246
2003	8,177
2004	7,163
2005	5,643
2006	4,832
2007	4,596
2008	4,173
Changes	-49.0%

Source: Cho. (2010).

Table 4.14 Comparison of city government subsidy before and after quasi-public bus system

Classification	Before (2003)	After (2005)	Change (%)
Subsidy (US$ million)	84.5	193.1	128.5
Subsidy per vehicle (US$)	10,609	24,696	132.9

Note: 1 US$ = 1,150 Korean Won
Source: Mo et al. (2009).

The Seoul City Government has to increase the amount of subsidies for private bus companies from US$84.5 million in 2003 to US$193.1 million in 2005. This increasing trend for bus subsidies has continued until 2012. Kim and Kim (2012, 63) argued that "productivity went down in terms of distance traveled" and that "productivity as measured in terms of the number of passengers can be said to have deteriorated as well." They also pointed out that "increased wage levels for drivers were cited as the most important factor that caused the drop in productivity." (Kim and Kim, 2012, p.63) However, it is not clear that the quasi-public bus system is the main cause of the drop of productivity and the increase of bus subsidies because the Seoul City Government has not increased bus fares annually and has provided significant discounts on transfers between transit modes such as bus and metro.

5.5 Policy Lessons

The bus reform in Seoul has totally changed the negative view of buses from an inferior public transit mode compared with LRT and MRT to a positive mode that can play a superior role in increasing the convenience of public transit users. The change of operation system from purely private to quasi-public allowed the city government to provide reliable services for citizens. ASEAN megacities should seriously consider buses as an essential transport mode to meet increasing traffic demand by rapid urbanization.

This unique quasi-public bus system in Korea can be suggested as a new alternative operation system for developing countries whose bus operation systems are pure private. In most ASEAN countries, the direction of bus reform is from a public operation to a public-private partnership, such as a competitive tendering system. "In contrast, in many developing countries, since private bus companies provide bus services for citizens either without receiving any government subsidies or by receiving partial government subsidies, the direction of bus reform is from private to public." (Mo, 2012, p. 109).

"Bus users in Korea could severely suffer from unstable bus services during the transition from private to public bus system based on a competitive tendering system if the central and local governments completely relied on market forces to force structural reform to change their bus operation system from private to public. Under this market-based restructuring system, the Seoul City Government could gradually recover the ownership of the unprofitable bus routes that private companies gave

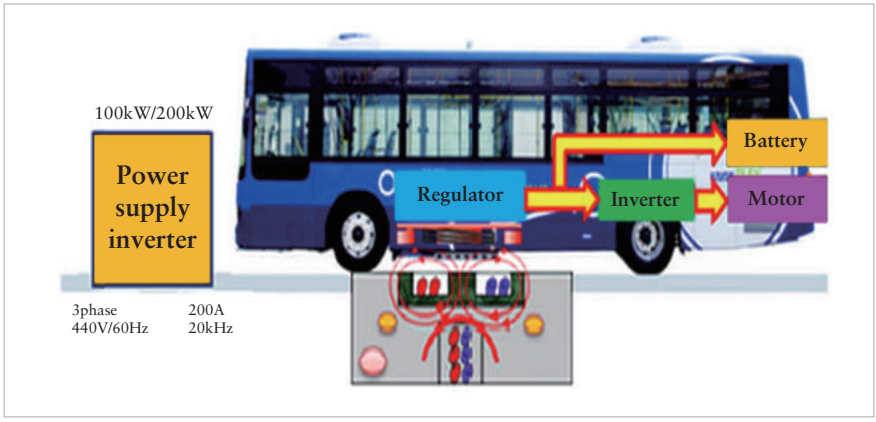

Figure 4.17 Electricity bus in Korea

up on and operate them through a competitive tendering system." (Mo, 2012, p. 109).

Instead, the bus reform in Seoul in 2004 focused on the gradual improvement of bus passengers' convenience and produced positive changes for bus passengers by implementing bus route reorganization by metropolitan lines, trunk lines, feeder lines and circulation lines, implementation of an integrated distance-based fare system, introduction of a transit card system and creation of a transport information center for BMS and BIS.

The expansion of the bus network can work as an effective countermeasure to the rapid increase of motorcycles in ASEAN megacities. The increase of buses on streets will significantly reduce the number of motorcycles from the perspective of public transportation. Until now, there has been a lack of discussion about this phenomenon in ASEAN megacities.

In addition to the bus operation system, ASEAN megacities can run electricity buses on streets to achieve low carbon and green growth. The electricity buses can also help achieve better air quality and other environmental goals in ASEAN megacities through the use of clean electricity and reduction in automobile traffic and congestion.

6. Two-Phased Development Strategy of Mass Transit: from BRT to MRT

Changhwan MO

Road investments usually cause the overuse of private passenger cars and cannot serve to reduce traffic congestion. More importantly, MRT requires excessive construction costs and leads to huge financial burdens on governments. Since ASEAN megacities do not have enough financing resources, BRT is a reasonable option for city residents. More importantly, these megacities can use this BRT strategy as an efficient policy for public transit, since BRT can be a flexible mode. I recommend a two-phased strategy for mass transit in ASEAN megacities. First, these megacities construct and operate a BRT system in certain corridors as a BRT line. Second, if the BRT system does not meet the traffic demands of that line because there are too many passengers after a number of years, the central or megacity government should change its system from BRT to MRT or LRT on that line.

A BRT system is necessary for ASEAN megacities as it is considered to be a "subway on land," which means the on-time performance of a railway combined with the flexibility of buses. The BRT system can also work as an effective tool for transport demand management by reducing the overuse of private passenger cars on urban roads. Many people, even transport experts, do not recognize this merit of BRT clearly. ASEAN megacities can change their transport system from auto-oriented to transit-oriented by introducing BRT to achieve the vision of low carbon and green growth.

I strongly recommend that public officials and transport experts in ASEAN megacities not follow the policy errors of other advanced countries in transportation. For example, Korea had a lot of flyover roadways and many pedestrian overpasses and underground passes, but has demolished most of them. Instead, Korea has been constructing a lot of crosswalks, median bus lanes, and roundabouts, which make private passenger car use inconvenient. For example, the Seoul City Government demolished

Figure 4.18 BRT system in Bangkok (1)

Figure 4.19 BRT system in Bangkok (2)

an elevated highway covering the Cheonggye Stream on July 1, 2005, and restored the stream to make a human-oriented, environmentally friendly society. To absorb the traffic demand after the demolition of the flyover, Seoul made a radical reform of bus routes and operation systems. In particular, BRT was introduced to provide better transport services for those car drivers and bus passengers who had regularly used the gigantic flyover in the city center.

Figure 4.20 Restoration of Cheonggye Stream in Korea

6.1 Concept of BRT

The greatest advantages of BRT are low cost and high efficiency. The necessary facilities for this system are exclusive lanes, special vehicles, elevated and exclusive ramps at intersections, priority signaling, transfer facilities, and operation systems, such as an operation center, BMS and BIS, and fare systems.

Unlike buses, BRT is expected to demonstrate the advantages of both buses and railways with bus right-of-way, priority signaling, large-size vehicles, convenient transfers, high-quality stations, a bus information system, high speed, and on-time performance. In comparison, buses provide lower services in terms of on-time performance, speed, convenience, and comfort than BRT. But buses can provide mass transit services at low costs. Urban railways carry a large number of passengers and provide a high level of services, but urban rail systems have the disadvantages of high costs and the rigidity of operation. In the case of an ideal BRT, it has all the advantages of buses and railways and does not have the disadvantages of either mode. As a result, BRT can provide speedy and on-time performance with low costs, medium quantity, and flexible operations. The BRT system is a new public transportation system that has integrated the concept of a railway system into bus operations.

The Korean government promotes BRT to handle traffic demands and create a convenient and speedy public transportation system. The central government subsidizes BRT, and the subsidy ratios of BRT construction costs are 50% for a metropolitan BRT, which refers to BRT lines connecting more than two local governments, such as Seoul and Gyeonggi Province.

The central government published a manual on BRT construction

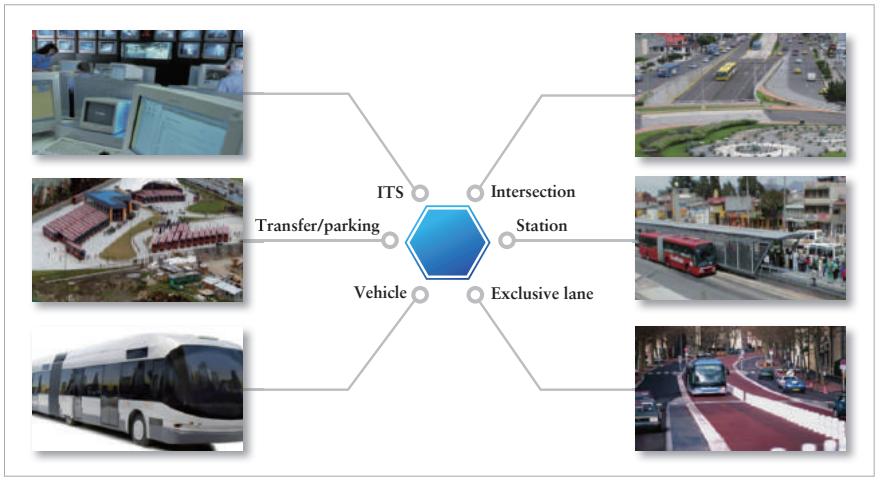

Figure 4.21 BRT factors

Figure 4.22 Comparison of mode vehicles

Figure 4.23 BRT in Korea

guidelines so that local governments can construct BRT properly. The Ministry of Land and Transport (MLT) published planning guidelines for BRT in 2005, and the government revised it in 2010. According to the guidelines, there are two types of BRT. The first is called a "new type,"

which is a high level of BRT. Special vehicles run on exclusive roads and pass intersections through either overpasses or underground passes. The average speed is 35 km/h, and passengers pay the fare at stations. This system also has transfer facilities with a dedicated operation management system for BRT. The other type of BRT is called "general" and is a low level of BRT. Regular buses operate on exclusive lanes and cross intersections with priority signaling. The BRT buses are mixed with other buses. Passengers pay the fare on the buses, and the average speed is about 20 km/h.

The central government also recently enacted the BRT Special Act on Construction and Operation that include BRT planning, BRT licensing, government subsidies, operation management system, role assignment between central and local government, an adjustment plan for BRT and ordinary bus lines, a conflict resolution method between local governments, and performance management. The Special Act on Construction and Operation of BRT was enacted on June 2014.

Table 4.15 Types of BRT

Type	Vehicles	Runway	Intersection	Station	Transfer facilities	Operation management system	Recommended average speed (km/h)
New Transport	Special vehicle	Exclusive road/ separate	Overpass or underground pass	Payment at the station	Included	Dedicated system for BRT	35
General	Regular vehicle	Exclusive lane/ mixed with buses	Partially/ priority signaling	Payment on the bus	Partially	BMS/BIS	20

Source: MLTM. (2010). *Planning Codes of BRT*. Gwacheon, Korea: MLTM.

6.2 BRT Operation in Korea

As of 2014, there are 12 corridors running in Seoul, and the length is 117.5km. The Seoul City Government has constructed median bus lanes with the operation of private bus companies. The level of BRT is low, and other buses can freely run the corridors. Gyeonggi Province has four corridors with a length of 29.9km, and Incheon City has one BRT line with a length of 19.6km. The total length of BRT in the Seoul metropolitan region, which is composed of Seoul, Gyeonggi Province and Incheon, is 167km.

Table 4.16 Current status of BRT in Korea

Local governments	Seoul	Gyeonggi Province	Incheon City	Daejon City	Sejong City	Total
Number of corridors	12	4	1	3	1	20
Total length (km)	117.5	29.9	19.6	11.5	31.2	190.1

Daejeon City has three BRT corridors with a length of 11.5km, and Sejong City has one 31.2km line. The Sejong BRT goes from Banseok in Daejon to the Ohsong KTX station by way of Sejong City. The total length of the BRT is 190.1km, and the number of lines is 20 as of 2014.

There are five metropolitan BRTs that connect at least two wide-area local governments, with a total length of 99.5km. Both of the BRT corridors of Goyang Daehwa-Ehwa University and Guri-Mangwoo are made of by connecting Seoul and the Gyeonggi BRT corridors. But the three other metropolitan BRTs were planned as connecting lines between two wide-area governments from Gyeonggi or Incheon to Seoul.

The Sejong BRT, which connects Banseok in Daejon, Sejong City, and the Ohsong KTX station was planned to "provide city dwellers with a sustainable transportation system by promoting transit-oriented development. The objectives of its public transportation plan are to provide a faster, more comfortable, and more convenient public transportation network than automobiles, to build a transit-oriented orbital road which makes it possible to reach any point in the city within 20 minutes, and

Figure 4.24 BRT System in Seoul

Table 4.17 Metropolitan BRT in Korea

Line	Length (km)	Opening year
Hanam-Cheonho	10.5	2011
Cheongla-Gangseo	19.6	2013
Goyang Daehwa-Ehwa Univ.	22.4	2006
Guri-Mangwoo	15.8	2010
Banseok-Sejong-Ohsong KTX	31.2	2013
Total	99.5	-

Figure 4.25 Cheongla-Gangseo BRT

to provide a seamless transfer between public transportation and other modes." (Park, 2012, p.57) There are five park-and-ride facilities on the transit-oriented orbital road and two main transfer centers. To maximize the function of the public transit system in Sejong City, BRT provides services for trunk lines, and ordinary buses provide services for feeder lines. "The feeder lines are linked to the transit-oriented orbital road by connecting it with main living areas, and they also cross-connect between adjacent living areas." (Park, 2012, p.59)

A metropolitan BRT line from Hanam City in Gyeonggi Province to Cheonho in Seoul was opened in March, 2011 to reduce traffic congestion. It led to an increase in operation speed by 9.3%, ridership by 23.5%, and an improvement in punctual services. Another BRT line from Cheongla in

Incheon City to Gangseo in Seoul also increased in operational speed by 6.1~15.2%, and the rate of mode transfer from private passenger cars rose by 16.5%.

6.3 Problems in BRT Implementation

While BRT is constructed and operated in Korea, there are several problems with it. First, costs are high when the government is trying to construct a new type of BRT because it is required to construct elevated and underground roadways at intersections. This high cost decreases the economic feasibility of BRT construction. Second, complaints from citizens increase due to the reduced vehicle lanes and inconvenience from the prohibition of U-turns and left turns. Third, local governments and citizens prefer urban railways to BRT because of insufficient differentiation between BRT and ordinary bus services. Citizens seem to have a negative image of BRT in terms of the provision of inferior transit services. This originates from a lack of understanding of BRT's role as an alternative to urban railways. Fourth, due to the financial burden on local governments, low subsidy rates act as a hindrance in promoting BRT. For example, Gyeonggi Province has reduced its rate of BRT subsidy from 25% to 15% since 2010. Following this the cost share ratio for BRT in Gyeonggi Province is 50% for the central government, 15% for the provincial government and 35% for local cities.

Although road widening is inevitable for the partial sections of BRT lines due to obstacles such as underground roadways, four-lane roads, and lack of space, BRT subsidies are not allowed to widen roads and compensate the cost of land in Korea. This strict subsidy policy by the central government for BRT makes it difficult to expand BRT networks.

In addition, conflicts among local governments is another important problem when a metropolitan BRT is constructed. Those local governments that have passing BRT stations receive relatively low benefits compared with other local governments that have starting BTR stations. Those local governments with transient stops and final stops oppose a metropolitan BRT in Korea because they have to share the same portion of the construction costs by length of BRT lines. For example, the cities of Seoul and Bucheon are against cost sharing with Incheon City for the construction of the Cheongla in Incheon-Gangseo in the Seoul BRT. Bucheon has been opposed to the construction of BRT.

The complaints of citizens on BRT construction mainly come from private car users due to the reduction of street lanes and inconvenience from the prohibition of U-turns and left turns. Due to the deficiency of serious research and discussion on operation and management strategy after construction, the BRT project between Cheongla and Gangseo was delayed by three local governments and their absence of a conflict resolution procedure.

Since transit operation businesses, roads, transfer facilities, fares, vehicles, and traffic signal systems are separately controlled by different laws, and the integration requirements of BRT are not secured by present laws and regulations for the success of BRT operation, before the enacting of the Special Act on Construction and Operation of BRT in 2014, the whole circumstance leads to the lack of a legal foundation for supporting BRT construction and operation.

6.4 Policy Lessons

The BRT system is not only favorable in terms of cost-effectiveness compared with other transport modes, but it is highly expected that it will greatly contribute to the improvement of sustainable development in a city. The BRT system is helpful to build a compact city with pedestrian-oriented or transit-oriented development.

The two-phased implementation strategy of BRT and urban railways should be taken for ASEAN megacities. If a BRT line has too many passengers to carry, an urban railway line can replace it at the second stage. The new transport type of BRT is also recommended for newly developing towns, while the general type of BRT needs to be built on existing roads in old towns.

The central governments in ASEAN countries should enact a special law for the expansion of BRT. The law needs to include specific contents on these issues: planning, licensing, construction procedures, government subsidies, cost sharing, operation and management systems, role assignment between central and local governments, adjustment plans for BRT and ordinary bus lines, a conflict resolution method among local governments, transfer plans with buses and urban railways, priority signaling, station operations, service evaluation, and performance management.

It is necessary for the central governments of ASEAN countries to publish a manual of BRT construction guidelines for promoting BRT in ASEAN

Figure 4.26 A closed BRT system in Jakarta

megacities. The manual needs to include these contents: planning standards, vehicles, exclusive lanes, service levels, runways, intersections, planning speed, terminus, stations, pavement, signaling facilities, crosswalks, transfer facilities, transfer convenience facilities, facilities for the transport disadvantaged, transfer information systems, transfer walking, vehicle parking, operation centers, BMS, BIS, fare collection systems, and so on.

When ASEAN megacities construct BRT systems, it is better to choose an open system because of a lack of BRT demand. During peak hours, for example, 1,600 passengers per hour on one exclusive median lane is not economically efficient or politically acceptable. In Korea, the standard of a median lane is a maximum of 120 vehicles and 6,000 persons per hour at peak hours.

It is more efficient to share the BRT facilities with other buses. In addition, to increase accessibility for BRT passengers it is recommended to have flat pedestrian crossings at BRT stations and prohibit the construction of elevated or underground passages to stations from streets. BRT, as an effective tool of transport demand management, is designed to improve convenience and give a priority to BRT users over private cars. The BRT system encourages flat crosswalks to BRT stations, and should limit the convenient use of private passenger cars on urban streets by giving a penalty to private passenger cars on public roads, since it should consider the more convenient usage of public roads for public transport users rather

than private car users. To achieve a successful BRT system and create its required circumstances, a BRT system should consider pedestrians over private car users, road investments under the scheme of PPP, and investments in public transport by the government.

The government's selection of BRT lines is required to secure connectivity among local governments, and the government should consider changes in the transport environment, such as urban redevelopment, delayed development of new towns, construction plans for urban railway lines, and housing development plans. A plan that includes BRT lines requires modifications that reflect the changes to the urban environment.

The central government's subsidy rate for BRT construction costs should be set at about 50%, as the Korean government does. It should also allow local governments to use a subsidy for BRT operation deficits in the starting period. In addition, government subsidies can be used not only for BRT facilities, but also for road expansions for BRT. For metropolitan BRT across more than two wide-area local governments, a distinct official agreement is required to include an operation and management plan in terms of specifications about operators and management, sharing financial burdens, a conflict resolution system, and licensing system of BRT lines for the local governments involved. It is also critical for the success of BRT to secure not only economic feasibility, but also policy acceptance by developing strategies for conflict resolution during its implementation.

The success factors for BRT systems are an increase in speed, on-time performance, convenience of passengers, implementation of transport demand control, improvement of accessibility through transfer facilities, increase of efficiency through route reform, and transit-oriented development (TOD). BRT is very difficult to implement and operate in reality. If a city has an auto-oriented transport system, the political and economic structure does not allow society to make the city a sustainable society. Persons who own and drive cars do not politically allow the society to make a sustainable transport system by introducing BRT on streets.

7. Sustainable Policy for Low Carbon and Green Growth

Sangjun PARK

Heavy dependence on private cars for travel has caused persistent social problems, such as traffic congestion and emissions of greenhouse gas. On the other hand, demand for mid- and long-distance transport is rising due to economic development, which prompts a call for action to tackle the situation. To cope with these situations and to participate in global efforts in reducing greenhouse gas in the transport sector, the Seoul City Government has set up sustainable transport to implement several transport plans, which is based on the Act of Low Carbon and Green Growth (2011).

Korea announced at the G7 summit held in July 2008 that it would set its mid-term GHG emissions reduction target, and the national mid-term target has been finalized in 2009 at 30% below 2020 BAU levels. The goal is highly significant as it provides a foothold prior to post-2012 climate change negotiations. Following the national move, the GIR established sectoral and step-by-step GHG reduction targets in July 2011 in cooperation with related agencies and industrial and civic communities based on their opinions and participation.

Korea announced its promised national GHG reduction target to the international community in 2009; prepared yearly sectoral and sub-sectoral targets to successfully meet the goal; and engages all parts of the society in GHG mitigation efforts.

Transport Sector : Introduce Green Cars to reduce GHGs and make the air cleaner ⇒ 34.3% reduction (37 million tons) against 2020 BAU levels

- Improve vehicle fuel efficiency with the introduction of Green Cars (CO 2 emissions: 140g/km by 2015, 125g/km by 2020)
- Expand the use of biofuels by mixing increased amounts with diesel

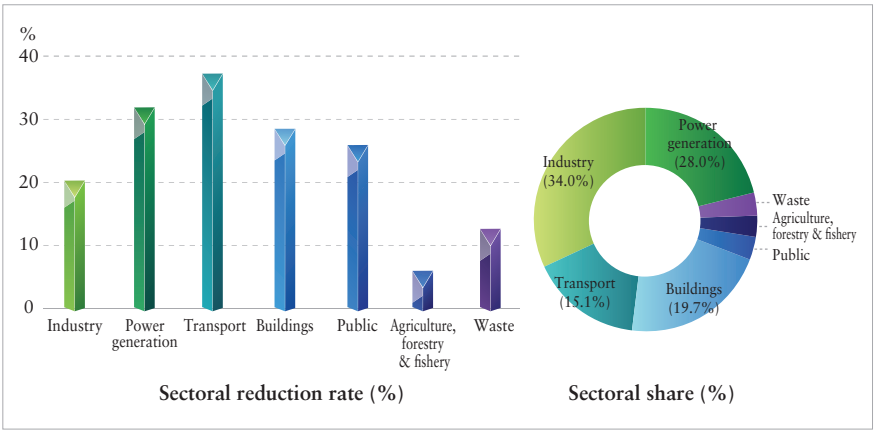

Figure 4.27 Korea's GHG reduction target

Source : <http://www.gir.go.kr/eng/index.do?menuId=12> (Accessed on Aug. 24, 2014)

and gasoline

- Improve the fuel efficiency of ships by increasing the use of renewable energy
- Policies and measures: expanding railroad networks, coast shipping, and Bus Rapid Transit (BRT) system; encouraging telecommuting, walking and riding bicycles, carpooling, and eco-driving

Based on a comprehensive law, the LCGG, the Ministry of Land, Infrastructure and Transport (MOLIT) has set up a mid-term (five-year) government plan for a sustainable transport system. Under the law, the metropolitan transport policy directions in Korea for tackling the traffic congestion problem can be broadly classified into the following categories: expansion and improvement of mass transport facilities, particularly railways; pursuance of transport demand management policies linked to land use; and establishment of operations management and information provision systems for public transport facilities. (KOTI, 2010)

As for the Seoul metropolitan area case, the analysis results demonstrated the need to put a priority on expanding railway-oriented transport facilities, and at the same time, pursue balanced implementation of various policies related to transport demand management as well as operation, maintenance and management.

In Korea, carbon dioxide emissions from roadways accounted for 16.1% of total national annual emissions, and roadways accounted for

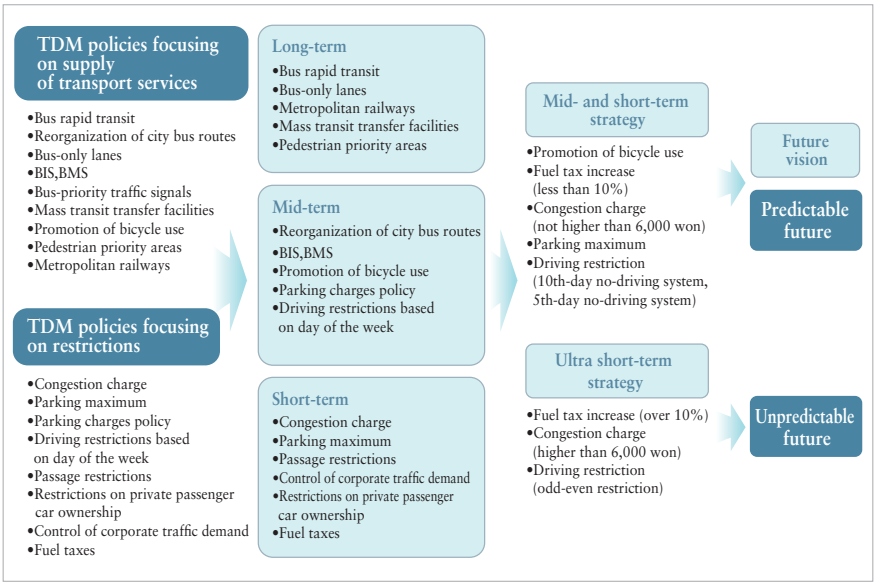

Figure 4.28 *TDM measures implementation strategy*

Source : The Korea Transport Institute.(2010). *Toward an integrated Green Transportation System in Korea*. Goyang, Korea: The Korea Transport Institute.

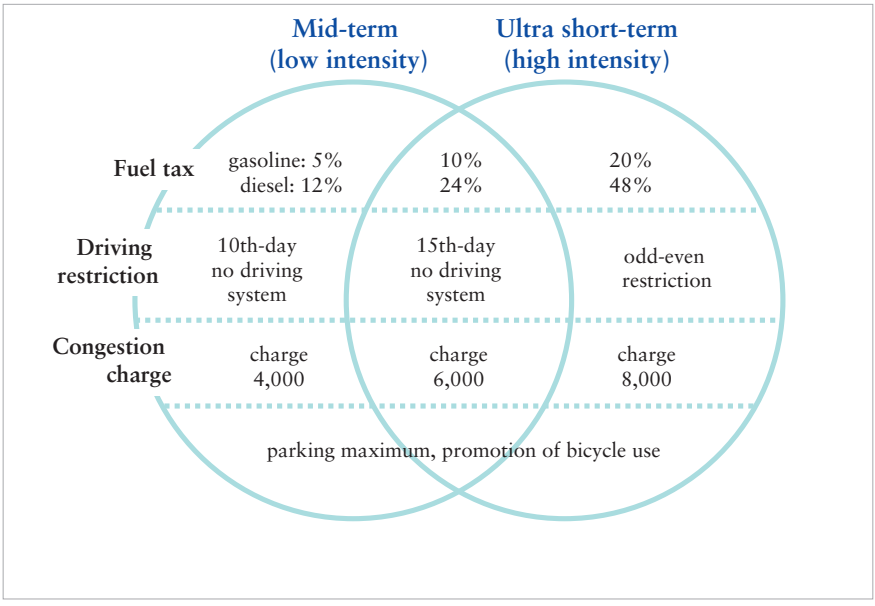

Figure 4.29 *Intensity of TDM tactics*

Source : The Korea Transport Institute. (2010). *Toward an integrated Green Transportation System in Korea*. Goyang, Korea: The Korea Transport Institute.

17% of domestic energy consumption (175 MTOE) in 2006. Roads have contributed to energy-consuming facilities that create mobility at the cost of fuel and resources, with fossil fuels accounting for over 80% of all energy expenditures on roadways.

Transport Demand Management (TDM) is incorporated with several policies and strategies to adjust transport demand to an appropriate level through changes in driver behavior. TDM strategies are acknowledged as efficient restrictions that have a relatively small traffic transfer effect, but are easier to implement. To achieve a sustainable transport system, Seoul has been putting into practice many TDM measures in the public transport system, such as reform of the public transport system.

In Korea, the overall TDM strategy consists of various combinations of five measures: promotion of bicycle use, parking maximums, fuel taxes, driving restrictions, and congestion charges. Figure 4.28 shows the TDM measures implementation strategy in Korea and Figure 4.29 illustrates the intensity of TDM tactics that have lead to a reduction of GHG.

Seoul has implemented many TDM measures. For example, transit-oriented development (TOD) is key factor for urban regeneration. We can find a high density of retail and businesses near public transport nodes, such as metro stations.

In terms of efficiency, the most environmentally friendly mass transit mode is rail. However, it needs a huge amount of funds and long construction periods. Seoul introduced a BRT system for an expansion of its public transport network in 2004, which is called "the reform of public transport system." The change to a semi-public operation of the bus system with an introduction of median bus-only lanes has increased the efficiency of bus operations. So far, it is one of the success stories in public transport area and is improving the quality of service as well.

8. Creation of a National Think Thank for Transportation

Young-in KWON and Changhwan MO

According to the experiences of Korea, a national think tank for transport policy research acts as an essential engine for the consistent implementation and realization of public transport strategies. As public officials often move to another department after they fulfil their term in one department, a national think tank can consistently argue for an important policy, such as the creation of a special account for public transportation.

For successful public transport policies, a research organization can also provide evidence and logic. For example, Korea took about five years to pass a law about the creation of a special account for transport financing after holding countless seminars for policy promotion to society and the mass media. The Korea Transport Institute (KOTI) initiated the law proposal and kept supporting it by promoting the idea to the mass media until it passed Congress. As a group, a national think tank can concentrate for a long time on achieving a goal. And the establishment of a public transport agency is also required for the general control of transportation. As an independent organization, it will work very hard to make public transport survive and prosper.

There are many ODA programs, such as the World Bank, ADB, JICA, KOICA and so on, for various transport issues in ASEAN megacities. Although these ODAs could be very helpful for the development of public transit in these megacities, there are few of their own transport plans for ASEAN megacities. If ASEAN countries have their own transport think tanks like the Korea Transport Institute in Korea, and ASEAN megacities have their own transport research institutes like the Seoul Institute in Korea, they can develop the capability to make their own public transit plans and transport policies. That is the reason why we strongly recommend that ASEAN countries and megacities create transport think

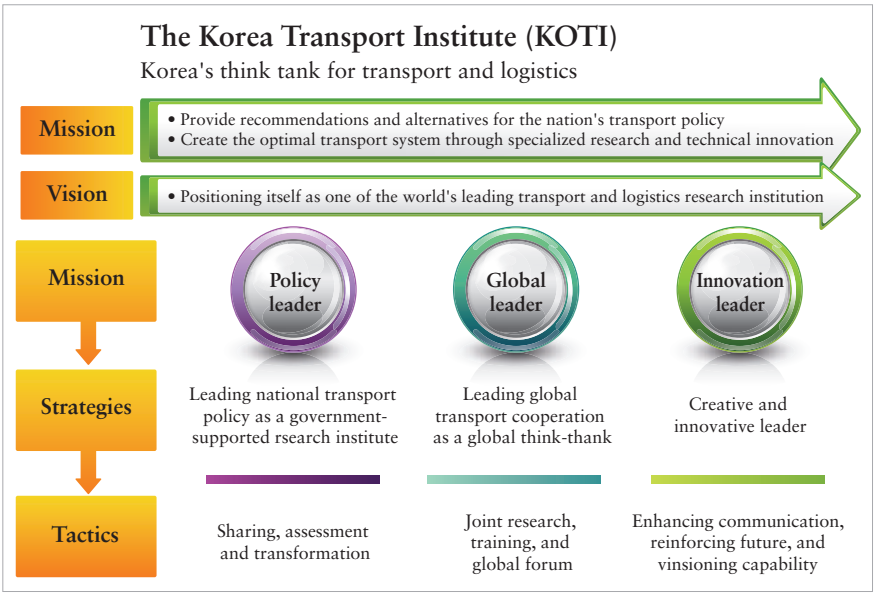

Figure 4.30 Mission, vision, goals, strategies and tactics of KOTI

tanks. Transport research institutions should be established outside the government as independent institutes so that researchers can receive higher wages than public officials to attract high-caliber researchers and have flexibility in operations.

A national transport think-tank helps to develop a long-term transport plan and improve the quality of public transport systems. We have a lot of evidence that a national transport think-tank has played a very critical role in improving the quality of the public transport system.

8.1 The Korea Transport Institute

KOTI is an official research agency for the government of the Republic of Korea and is officially chartered as a foundation pursuant to Article 32 of the Korea Civil Law. KOTI began operations as a government-funded institution pursuant to Article 24 of the Urban Transport Promotion Act, and the mission, vision, goals, strategies and tactics of KOTI is shown in Figure 4.30.

8.2 Role of Think Tank and Its Effectiveness

The successful development of an efficient, sustainable and highly effective public transport system for the ASEAN megacities requires not only technology and finances, but also, essentially, a package of policy and institutional measures. That is to say, the country's policy formulation and implementation capacity is as important as its funding and technical capacity. This requires in-depth knowledge and expertise on rational and systematic policy development and approaches.

In this context, it is advisable that ASEAN countries establish a professional think tank focusing on public transport-related studies and research, as well as transport-related policies to support the government and the cities. In this regard, KOTI may provide a case for reference.

As a government-funded research institute, KOTI has conducted and actively participated in various conferences and symposia while carrying out joint studies. Since 2003, KOTI has been participating in a wide range of international projects funded by the OECD, KOICA, ASEAN and other related agencies. The following are the areas of research at KOTI.

- Transportation Strategic Planning
- Transportation Engineering
- Transportation Safety and Highway Research
- Transportation Economics
- Transportation Administration and Legislation
- Intelligent Transport Systems
- Transport Surveys and Analysis
- Transport Logistics
- Aviation Research
- Railroad Research
- International Cooperation & North Korean Transport

Since its foundation, KOTI has been striving to expand its networks both domestically and internationally. Moreover, KOTI maintains close relationships with foreign institutions and organizations in order to contribute to the ongoing development of the national transport system through international academic exchange programs. KOTI has also maintained steady relationships with national and local governments, research institutes, academia, and other organizations by contracting MOUs with around 61 organizations in the world as of July 2013.

- Global Network (MOUs): 61 overseas organizations such as the World Bank, IDB, ADB, etc.
- Global Joint Research and Seminars
- Knowledge Sharing Program (KSP): Policy Consulting Program, Development Experience Module, Joint Consulting with International Organization

8.3 Capacity Building Program

Public transport training contents are being developed using video, images, and through other methods, and are being provided to government officials. The contents produced in the Transport Training Center are provided to enhance the public official's level of public transport operation, policy design, and other related areas. Using the supplied contents, public officials can enhance their traffic control usage skills, which can affect the enhancement of the entire public official level.

The training course is based on a hierarchical structure, so the public official who received the training course can take charge of the training. Each public transport training course consists of a basic course and an advanced course, depending on the training level of the participating public official, to support the enhancement of his or her level.

All training contents and curriculum of public transport are developed according to the development process, which can be optimized through cooperation with expert groups and training specialists. The process of training contents development and factors and methodologies of training management.

9. Creation of a Leading Public Transport Agency

Changhwan MO and Sangjun PARK

Since the division of authority among transport administrative organizations makes an efficient implementation of public transport policies difficult, it is important to make a reform of the administrative system by integrating the administrative authority of policy implementation with regard to public transportation.

In ASEAN countries, the gap of political and administrative power between road and public transport organizations causes a real problem in the implementation of public transport policy. Generally, the road organizations have higher power than public transport organizations do. In addition, local governments do not have the regulatory power to give licenses to public transport operators, but the central government is overloaded with local public transport issues and responsibilities. Local governments have the best knowledge of the needs of citizens

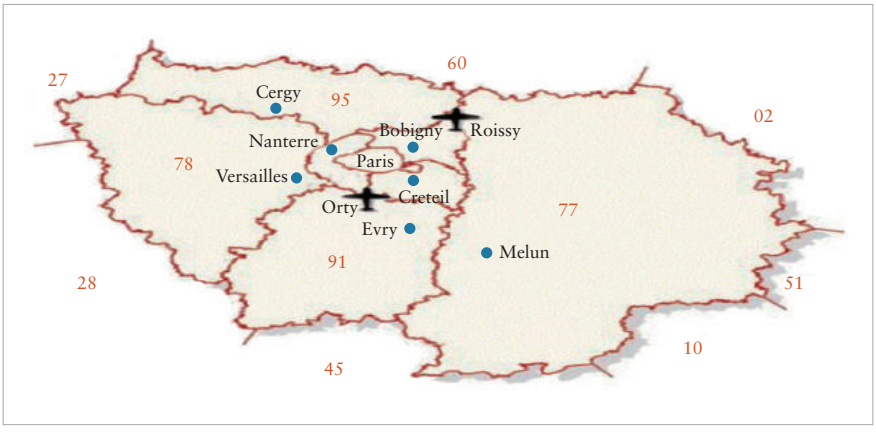

Figure 4.31 STIF jurisdictional boundary in France

because of proximity. ASEAN countries need to clarify the functions and responsibilities of sector agencies and between national and local governments to avoid duplication, conflicts and inconsistency. It is also necessary for them to separate the regulatory and operational functions of agencies.

ASEAN megacities have been expanding their regional boundaries to suburbs, and many people are commuting from satellite cities to the core city. For example, Korea has the Seoul metropolitan region, which is composed of three wide-area local governments, such as Seoul City, Incheon City and Gyeonggi Province. Although the flow of transportation does not stop at the administrative boundary of a wide-area local government, each wide-area local government carries out its own transport policy and administration. From there, conflicts of interest happen among those local governments in terms of public transport policy implementation.

To solve the fundamental problems of metropolitan transportation in ASEAN megacities, a metropolitan transport authority (MTA) should be created. Most mega-city regions (MCR) in the world have such metropolitan transport authorities, such as STIF for the Paris region, SYTRAL in Grand Lyon, MTA in New York, WAMATA in Washington, DC, RTA in Chicago, TFL in London, VBB in Berlin, and SL-Trafiken in Stockholm. The MTAs in ASEAN megacities should be able to effectively address metropolitan transport issues over administrative boundaries and construct, operate, and manage metropolitan public transport modes and facilities.

STIF, for example, plans, organizes and finances public transport for all Parisians. At the heart of the transport network in the Île-de-France, STIF unites all stakeholders such as travelers, politicians, manufacturers, carriers, and infrastructure managers, investing and innovating to improve passenger services. STIF is composed of the Île-de-France, the City of Paris and the seven other départements, and carries the vision of all transport, such as train, RER, metro, tram, T Zen and buses, of Ile-de-France. So it decides on and creates pilot projects for the development and modernization of all transport, which it entrusted to the operation of carriers.

9.1 LTA in Singapore

With its efficient operation and high quality of service level, Singapore's public transport system is known as one of the best in the world. In

particular, its Mass Rapid Transit (MRT) is famous for its efficiency and is one of the cleanest systems in the world. The MRT provides a high level of service quality such as safe, modern, air-conditioned passenger train service. Singapore has developed its own public transport system in a peculiar environment in which the jurisdiction of the responsible institution is limited to one municipality. Thus the process of making decisions is simple and quick compared with other ASEAN cities, like Kuala Lumpur, which covers adjoining, independent cities that together form the metropolitan area. Therefore, we would like to introduce Singapore's public transport system as one of the best example cases for urban public transport.

Singapore's LTA is another good example of a leading transport agency.

Table 4.18 Functions of LTA

Functions	Details
Formulation of land transport policies	Integration of transport planning with land use
Planning, design, and development of rapid transit systems (RTS) and road infrastructure systems	Focusing on system integration and technical design details of roads, tunnels, pedestrian overhead bridges, and other structures, and management of construction for new RTS projects and extensions as well as upgrades of existing rail lines
Management of road traffic and maintenance of related road infrastructure and systems	-
Promotion and regulation of public transport	Imposing, monitoring, and measuring minimum operating performance standards for bus and rail services in terms of service quality, safety assurance, and equipment performance
Regulation of private transport ownership and usage	-
Centralized bus network planning	-
Regulation of bus and rail fares	Assists the Public Transport Council (PTC) in actively monitoring and tracking the provision of bus services and bus service standards
Regulation of taxi services	The taxi industry is liberalized and operates under the Taxi Operating Licensing framework, which is regulated by the LTA
Traffic enforcement	Traffic management and enforcement are conducted jointly by the LTA and the traffic department of the Singapore police force. The LTA takes charge of enforcement against illegal parking and vehicle-related offenses and helps draft traffic safety legislation.
Integrated fare collecting	Translink, which was acquired by the LTA in 2010, offers an integrated fare collection system for the bus network and MRT and LRT systems.
Ticketing	Three subsidiaries under the LTA deal with ticketing and consultancy services

Source : Kumar, Ajay and Agarwal, O. P.. (2013). *Institutional labyrinth : designing a way out for improving urban transport services - lessons from current practice*. Washington, DC : World Bank Group.

That is, Singapore's success in the public transport sector owes much to the government's role, such as the Land Transport Authority (LTA), which is the primary agent for land transport in Singapore and is responsible for land transport development and policy setting. The LTA plans the long-term transport needs of the city, and oversees all road users, including private and public transport. In general, there are multiple agencies, at different levels of government, which are involved in the management and delivery of urban transport services. However, in practice, there is little or no coordination among them. This results in inefficiency in the use of resources and decision making and poor-quality services. That is why we need to develop an institutional coordination across space and function which can develop an integrated and comprehensive urban transport system.

In short, Singapore's success with its public transport system is based on one of the best leading institutions, the LTA, and has shown a good quality in its structure plan, which coordinates with land-use planning and has been implemented with continuous efforts.

Compared to other countries' institutes, the LTA has more-comprehensive responsibilities that are similar as London's TfL (Transport for London). The LTA is responsible for strategic planning as well as public transport service planning, which is a comprehensive set of urban transport

Table 4.19 Comparison of LTA and TfL

City	Singapore	London
Lead Agency	LTA	TfL
Strategic Planning	○	○
Transport Policy Planning	○	○
Fare Setting	×	○
Infrastructure Planning	○	○
Service Planning	○	○
Driver Licensing / Vehicle Registration	○	×
Traffic Management & Enforcement	○	○
Infrastructure Construction & Maintenance	○	○
Common facilities (terminals, bus stops, depots)	○	○
Public Transport Operations	×	×
Jurisdictions	All city-state	Greater London

Source : Kumar, Ajay and Agarwal, O. P.. (2013). *Institutional Labyrinth : Designing a Way Out for Improving Urban Transport Services - Lessons from Current Practice*. Washington, DC : World Bank Group.

systems. The LTA even owns and operates the interchange facilities and intermodal terminals.

Another key factor in the success of the public transport system in Singapore is financial viability for a better service quality. In Singapore, the LTA gets a huge amount of money from the government in the form of financial grants. According to the study by Kumar and Agarwal (2013), the LTA's budget for financing the capital cost of projects is funded primarily by grants from the government. The question on this point is whether, or how long, this system will be sustaintained in the future.

When we look at the budget flow of the LTA, it has an operational budget funded through a "management fee" that it receives from the government, and certain other revenues that accrue to it, such as vehicle registration fees, advertising fees, and fines. During 2010-11, the LTA received a total income of S$1,051 million, of which 38% was from management fees from the government, 11% was other administrative fees (e.g., vehicle parking certificate fees, vocational license fees, vehicle inspection fees, RTS license fees), and 51% was a grant from the government toward operational expenditures. The management fees from the government, along with the various administrative fees collected by the LTA, go into the land transport revenue account. The monies from this fund are used to defray operating expenditures, such as staff remuneration, road maintenance, street lighting, maintenance of LTA property, interest on loans raised by the LTA, as well as the repayment of loans from the government. (Kumar and Agarwal, 2013).

Like other governments, the Singapore government is very responsible for funding the development and construction of roads, expressways, rail infrastructure, and commuter facilities and retaining ownership of roads and road-related infrastructure. In order to fulfill these missions, the LTA has a central role in the public transport system, and has ownership of the rail system and licenses its operation to a private operator. In addition, on behalf of the government, the LTA collects various vehicle taxes, including additional registration fees, road taxes, certificate of entitlement premiums, and electronic road pricing fees. The revenue collected goes to the Ministry of Finance, so it does not contribute to the LTA's revenue or fund its transport projects. The capital costs of project expenditures for public transport infrastructure are mainly funded via development grants and advances from the Ministry of Transport. (Kumar and Agarwal, 2013).

Historically, Singapore suffered from a predominance of unregulated bus operations, fragmentation of responsibilities among multiple

institutions, and a strong bias toward capital expenditures in the mid-1970s. Consequently, it was followed by poor traffic management, serious congestion, inadequate and inefficient public transport services, and poor infrastructure. The bus sector was known as "mosquitoes" weaving in and out of traffic on haphazard routes and providing poor service. Yet, Singapore has made a great change in its public transport system and is now acknowledged among the best in the world due to the government's role and people's cooperation.

During the course of this Singapore showed that the role of the government, especially the LTA, and financial viability are crucial to enhance the public transport system. According to Kumar and Agarwal (2013), the key to ensuring the sustainability and effectiveness of lead transport institutions derives from:

- Their ability to deliver public value
- The political support they enjoy and their legal authority
- Internal capacity, through personnel, and secure sources of finance for their own operations
- Decision-making authority over financial resources for investment and operating subsidies

Finally, in this study, we recommend Singapore's case as a best practice for high-quality public transport systems for metropolitan cities, and it could give good guidance, especially, to ASEAN countries in the aspects of the roles of government and a lead transport institute.

9.2 SPAD in Kuala Lumpur

Like the LTA in Singapore, the SPAD in Kuala Lumpur (KL) is a similar land transport agency and is largely responsible for the public transport system of the KL/Klang Valley area. Its mission is summarized as follows: "To achieve a safe, reliable, efficient, responsive, accessible, planned, integrated, affordable and sustainable land public transport system to enhance socioeconomic development and quality of life." The SPAD developed the first Regional Master Plan for the Greater KL/Klang Valley Region, called the Greater Kuala Lumpur/Klang Valley Land Public Transport Master Plan.

The SPAD has played a critical role in the public transport of KL.

It implements several initiatives for the KL/Klang Valley area, such as bus expressway transit services, rapid transit networks, smart ticketing integration, refurbishing bus stops and establishment of performance standards for operators. It has also developed a series of guiding principles to aid the development of the Greater Kuala Lumpur/Klang Valley Master Plan.

10. Utilization of Technology for Public Transport

Sangjun PARK

The use of improved technology is also a way to solve the transportation problem. The representative technologies are ITS and the electronic ticketing system. They have enabled the implementation of BMS/BIS and the introduction of a smart card system. And it also requires better transparency of bus operation, which leads to the improvement of passenger convenience and bus management. The transport centered-ICT system is an integrated and inter-modal fare and information system for buses and metro. With this system, passengers can get maximum of four transfers within a single trip. It is an integrated fare scheme based on distance and service. Bus information is displayed at bus stops and also in smart phone applications. The integrated fare system works with a T-Money card, smart card, credit card, etc. It's free of charge for transfers within buses and the metro. It uses an accumulated distance-based fare system, with a basic fare up to 10km and additional fare per 5km.

When we look at the implementation process of ITS in Seoul, the Seoul Metropolitan Government inserted a regional action for ITS in a national plan that coordinated the linking of different cities and had a long-run approach. This implementation followed the desirable guidelines of the architecture implementation of the ITS.

Historically, the Korean government has put an emphasis on a transportation policy to combat congestion that focused on increasing infrastructure. Seoul has always been a central issue for the national transport plan for easing congestion. The problem did not result from the idea of increasing the provision of roads, but from the lack of coordination with the very useful tools of ITS and its application technologies, which are not only effective in resolving congestion, but can save up to 35% of costs compared with the infrastructure-only approach.

In order to improve the traffic system, the Korean government established the necessary foundations to deploy the ITS in an appropriate way. This was organized in five stages: in 1997 the (1) ITS Master Plan was launched and revised in 2000, the establishment of (2) Research and Development Programs in the same year, (3) Transportation Efficiency Act in 1999 and revised in 2000, (4) Standardization in 2000 and the (5) National Architecture, also in 2000. (Penaloza, 2004)

The MOCT (Ministry of Construction and Transport), formerly the MOLIT (Ministry of Land, Infrastructure and Transport), established an act to encourage the ITS. The "Transportation System Efficiency Act" is a basic law of ITS, established in 1999 and revised in 2000, which stipulates the establishment of ITS plans, research and development, standardization, implementation and organization. Its major contents are:

1. Article 12: Establishment of ITS Master Plan
2. Article 13: Establishment of ITS Implementation Plan
3. Article 14: Implementation of ITS Projects
4. Article 15: Establishment and Approval of Execution Plan
5. Article 16: Permission/Approval Accredited by Different Laws
6. Article 17: Inspection for Completion of Project
7. Article 18: ITS Standardization and Safety Management
8. Article 23: Establishment and Functions of National Transportation Committee

The structure of Korea's national architecture of ITS has several stakeholders; thus, an ITS working committee and subcommittees were established under the national transportation committee in accordance with

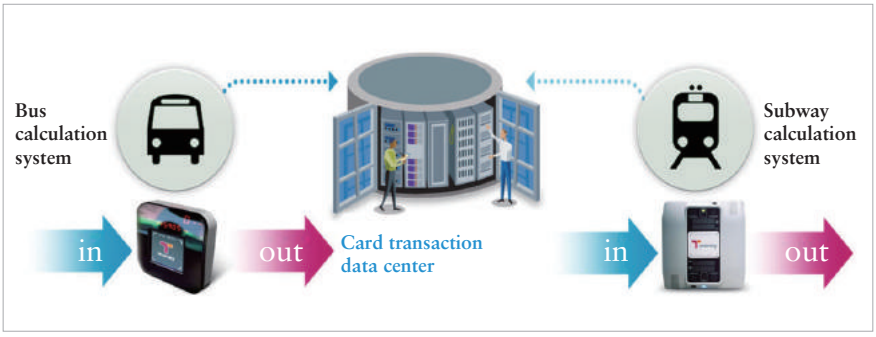

Figure 4.32 Operating principle of ICT system

Source: Kim, Gyeng Chul, Korea's Challenge for Economy and Transport Development, June, 2013

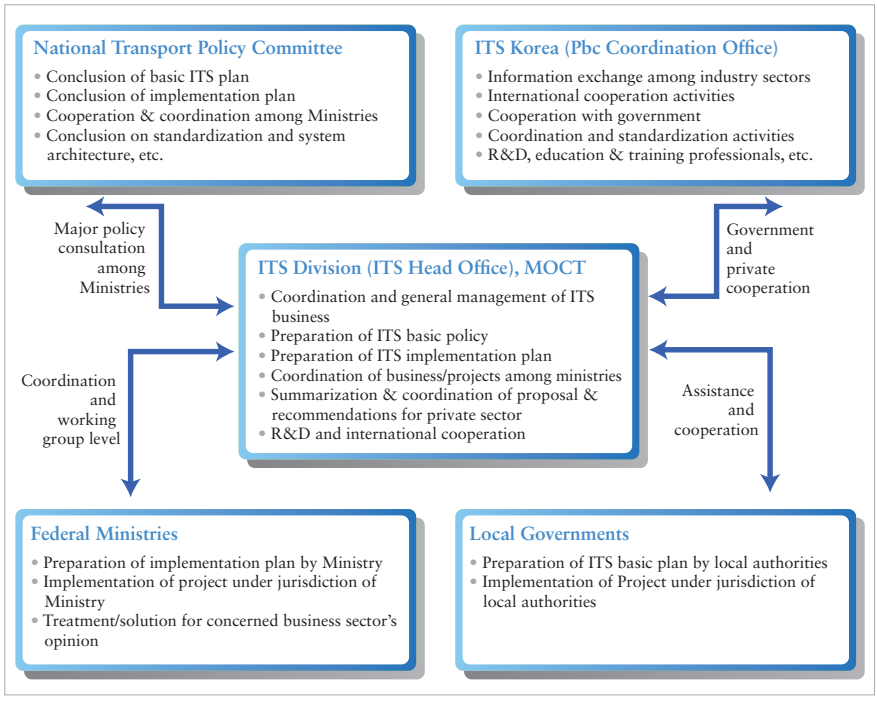

Figure 4.33 *ITS organizations and their roles*

Source: Peñaloza, Andrea M.R. (2004). *The Intelligent Transportation Systems (ITS) as a Tool to Solve Congestion Problems: the Case of Seoul*. Master Thesis. Seoul, Korea: KDI School of Public Policy and Management. p.41.

the transportation system efficiency act. The ministries are coordinated with the committees, as well as the local government. Figure 4.33 shows the different ministries and committees and their responsibilities in the ITS architecture.

The Seoul Metropolitan Government enters in this entire national scheme, which has a wide spectrum and non-isolated measures. The appropriate administrative architecture has been planned to introduce the ITS tools as a whole to obtain more effective results. (Penaloza, 2004).

The Seoul City Government now has several institutes and organizations for operating ITS and provides transport-related information to the public in real time. In particular, the Seoul Transport Operation and Information Service (TOPIS) has been playing an important role to gather and provide transport information from and to the public.

11. DB Construction for Public Transportation

Changhwan MO

Through the construction of a national transport database, the basis for a rational transport policy evaluation was founded in Korea. The government is preparing and enforcing prior and post-evaluation systems, such as the feasibility analysis, to evaluate the investment in transport facilities and to establish other traffic policies. The goal of this strategy is to provide basic data for such evaluation from the national transport database. This DB is constantly producing the origin and destination traffic of passengers and freight, including future predicated values, the network for the transport analysis, and social and economic statistic data. I recommend ASEAN countries to build up the transport database for improving transport investments decision-making. In particular, since ASEAN countries need to construct many urban railway lines, they should implement economic feasibility studies to decide which line should be constructed first. To do an accurate evaluation and forecasting, they are required to construct a national transport database.

11.1 Current Status of the National Transport DB Scheme and Regulations

After the Ministry of Finance and Planning has demonstrated its validity in the preliminary feasibility study, the competent ministry promoting the project shall judge the economic and financial feasibility once again through its own feasibility study for a public institution or a private business enforcer to promote the transport SOC project. At this time, a national transport DB must be used as a basic material. This is defined by Article 12 and Article 17 of the "National Transport System Efficiency Act." In the case of a breach of these provisions, there may be administrative

penalties imposed, such as the suspension of the project, etc. on the basis of the Enforcement Rules of the same Act.

National Transport Survey

(1) The government shall conduct a nationwide transport survey (hereinafter referred to as a "national transport survey") as prescribed under the Presidential Decree, in order to ensure the reasonable development and implementation of national backbone transport facility development projects, mid-term investment plans, and other national transport policies.

(2) The government shall develop five-year national transport survey plans outlining the goals, strategies, survey details, and methods, in order to ensure the national transport survey and the non-overlapping of independent surveys, the efficient implementation of transport surveys, and the sharing of survey findings.

(3) The government may request the head of the public agency to submit such materials or render such assistance as may be necessary to conduct a national transport survey or develop a national transport survey plan, with which request the head of the public agency shall comply, except under extraordinary circumstances.

Comprehensive Management of Transport Survey Data

In order to collect, analyze, and provide the data generated by national transport surveys and disaggregate transport surveys in a systematic and comprehensive manner, the government shall build and operate a national transport database, and periodically publish national transport survey reports pursuant to a presidential decree.

The government shall comprehensively review the appropriateness of the surveyed data and the connection with the national transport survey data when he constructs and operates individual survey data as the national transport database. He/she may conduct additional expert analysis when needed and may consult and adjust with the National Transport Database Council. In implementing transport-related policies, plans, projects, etc., the head of the public agency shall utilize the national transport database and national transport survey reports as base materials.

The government may let relevant experts or specialized institutions review the national transport database pursuant to the provisions of

the ministerial decree in order to gain credibility and objectivity for the national transport database.

In order to facilitate the construction of the national transport database, the government may, as prescribed by the Presidential Decree, organize and operate the National Transport Database Council, participated in by relevant public agencies. The Presidential Decree shall prescribe matters concerning the construction and operation of the national transport database.

11.2 Changes to the National Transport DB Project

The legislation ground for this project is the "National Transport System Efficiency Act" and its enforcement ordinance. The Act was first enacted in 1999 as the "Transport System Efficiency Act" to promote the establishment of investment plans for transport facilities, investment evaluation, and the intellectualization of transport systems and to prepare financial resources for their expansion and management through the "Act on Special Accounts for Transport Facilities."

This act prescribes that the national transport survey shall be enforced in order to perform rationally a national infrastructural transport network or a medium-term investment plan. Furthermore, it specifies a comprehensive management of individual transport surveys. National transport investment plans and the national transport DB, when being evaluated, were utilized on this basis.

In July 2001, the "Transport System Efficiency Act" was partly revised. To construct and operate the national transport system more effectively, partial supplements for the current institutions were made, such as the determination of guidance for the transport survey, the construction and operation of the national transport database, and the preparation of grounds for the establishment of a special transport measure at the time of rapid increases in transport demand, as on holidays.

Since then, the overall amendment was made in December 2009 through minor revisions. Following the enactment of the "Transport System Efficiency Act," the enforcement ordinance of the same act specifies the matters to be delegated, such as a transport survey and its implementation. Among these, the provisions regarding the transport survey are that the transport survey shall be conducted nationwide every five years, and include the status of operation and use of transport means facilities, transport

volume by each means facility, cost of traffic congestion and energy consumption by each transport means, transport forms of passengers or freight, and other matters needed fo the establishment of transport-related policies and plans.

Since then, in August 2001, following the revision of the same Act, the enforcement ordinance was also revised. Its main purpose was to additionally determine the matters to be delegated in the same act, such as the methods of enforcement of the national transport survey and the procedures of the consultation with the government or the matters to be necessary to enforce the same act. The transport surveys on a national level are distinguished into periodic surveys that target the whole nation and ad-hoc surveys that target specific regions or purposes. After periodic surveys, a national transport survey report must be publicized, and if a specific transport survey is planned by a public institution, a device is prepared so that an agreement must be done in advance with the government. For the standardization of transport surveys, their guidance shall be provided.

In November 2008, another revision was carried out. The main difference is that the range of a national transport survey has been extended and there are provisions to allow the establishment of a "national transport DB council" in which relevant public institutions would participate to consult about the establishment of a national transport DB and about transport survey-related issues. The range of a national transport survey included surveys on various transport costs, greenhouse gases, and energy consumption in order to respond to environmental changes at home and abroad.

1. The current status of registration and usage for each means of transport;
2. The operational routes, traffic volume, traveling distance, and other availability and operational data for each means of transport and each transport facility;
3. The origin-destination traffic of passengers and freight for each means of transport and each transport facility;
4. The transport and logistics costs disbursed in connection with, inter alia, the use of means of transport, and the investment in, and operation and maintenance of transport facilities;
5. Traffic congestion, traffic accidents, environmental pollution, greenhouse gas emissions, and other transport-related external social costs incurred in connection with transport and logistics activities;

6. Energy consumption and efficiency for each means of transport;
7. Greenhouse gas emissions for each means of transport;
8. The volume of transportation and modal split ratio for each means of transport and each transport facility; and
9. Any other matters as may be necessary to develop transport-related policies and plans, and analyze and evaluate transport facility investments.

In January 2010, it was explicitly allowed that the central government and the local governments may perform a transport survey in collaboration. These were cases where the specific transport and national transport surveys were duplicative or the heads of the local governments paid for a portion of the national transport survey and participated in return in such national transport surveys. Through this legal foundation in 2010, the central government conducted joint surveys with each local government in the Seoul metropolitan area and in regional metropolitan cities, and from 2011, performed the analysis of survey results and the establishment of the construction of the origin and determination travel volume jointly with the local governments.

Through the continuous revision of the "National Transport System Efficiency Act," which became the ground for the national transport DB project, the range of the national transport survey has been expanded and thereby the demand for the construction of the basic data of the transport database and for the utilization of the data by other organizations is constantly increasing .

11.3 Issues and Lessons

A study to improve the credibility of the data is required to be continued, the methods for the survey and the analysis should be improved and a data sharing system through the Internet needs to be prepared and should be released to the public so that the DB is made to be used for research and analysis not only in the public sector, but also in the private sector. This has lead to the activation of research and analysis on transport investment in the private and public sectors in Korea, as well as in the academic world, and to improvement in the rationality of the evaluation results. Also, this resulted in the prevention of fragmentary particular and duplicated surveys by each transport plan or project and contributed to

the minimization of governmental budget waste, such as the securement of expertise and consistency through the standardization of surveys and analysis (Kim, 2013). However, it is required to make continuous efforts in gathering qualified basic data and analysis technology through continuous investments, and in improving the credibility of transport demand and utilizing the transport DB in various fields.

It is very important to establish national traffic surveys and a traffic database on a national level and to utilize them in transport investment projects and all sorts of transport policies. They can be utilized as very useful data in the prevention of duplication surveys, the evaluation of various transport SOC investment projects in a short period of time on the basis of credible material, and the imposition of priority to and promotion of theprojects (Kim, 2013). Additionally, when the data required by private institutions and individuals besides governmental institutions is provided in real time, the function of the national transport DB could be extended more and its utilization more enhanced (Kim, 2013). For this, it is necessary to construct and provide more credible and useable data from the standpoint of users.

12. Development of Urban Public Transport Planning Capability and Road Map

Young-in KWON

12.1 Korea's Experiences

The history of urban public transport is the way to find the appropriate measures to cope with traffic congestion in urban areas. After the Korean War, the population in Korea moved to Seoul for employment. Such a high population concentration caused problems, especially in terms of housing and transport. Buses soon became a major mode of transport, but due to the severe traffic congestion on roads, along with rapid motorization, there was a limit to which the buses could handle travel demand. As a result, the subway system was built in the 1970s and 80s as a mode of mass transit. Additionally, strong measures were introduced that were aimed at managing transport demand. In the 2000s, substantial efforts to achieve a sustainable transport system were made, highlighting the importance of environmentally friendly, human-oriented transport modes.

Social overhead capital (SOC) such as road construction was heavily built to promote national economic development during the 20 years from 1960 to 1980. In the 1980s, road congestion was spreading in Seoul, specifically the central business district, which gave way to the establishment of the Urban Transport Management Promotion Act in the late 1980s. The Transportation System Management (TSM) was primarily enforced to relieve road congestion during the 1980s, while Transportation Demand Management (TDM) policies began to be more attractive to policy decision-makers since the early 1990s. As suburbanization has rapidly progressed since the 1990s, the central government has started to construct integration and multimodal transport systems at the regional and national level.

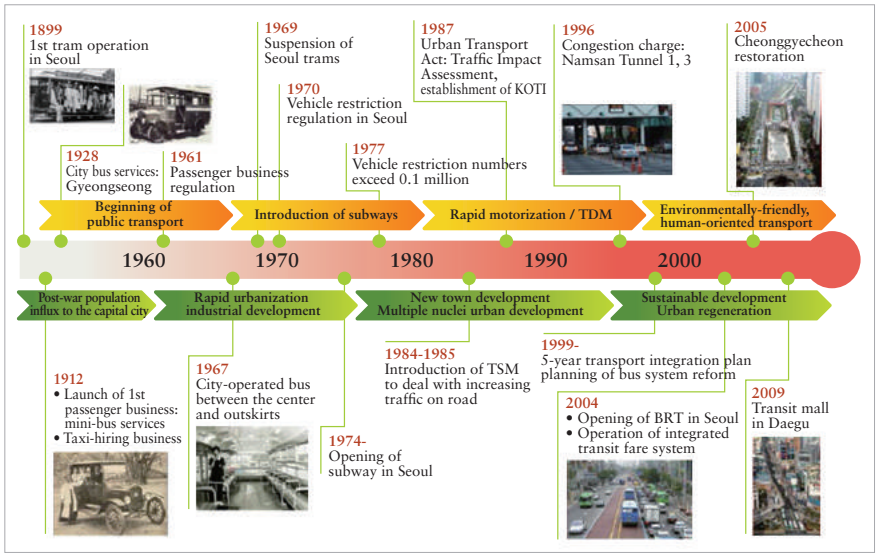

Figure 4.34 *Pathway of public transport policy of Korea*

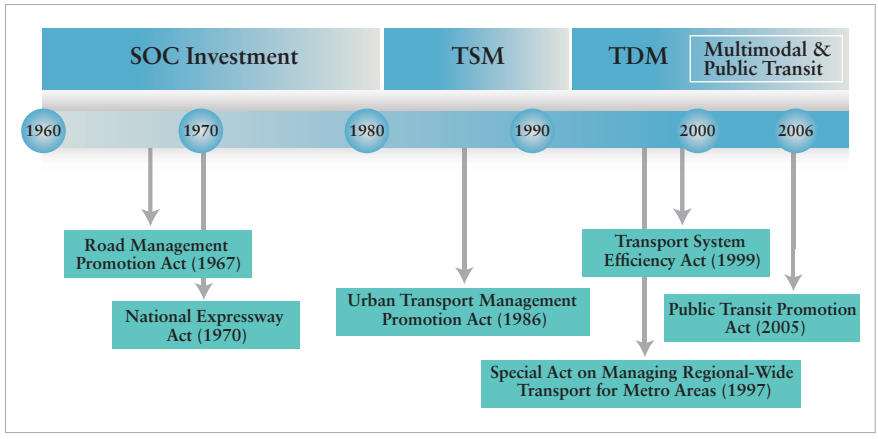

Figure 4.35 *Public transport policy trends of Korea*

12.2 Development of Public Transport Master Plan for ASEAN Megacities

A master plan for the transport sector could be developed with the directions drawn for transport improvement. To develop a public transport master plan for ASEAN megacities, project teams should be formed to improve efficiency in collaboration, which could be organized as follows:

- Investigation team for current conditions of public transport sector
- Forecast team for public transport demand
- Planning team for implementation
- Research team for review of legislation
- Public transport project management team

Urban public transport for mobility planning needs to be multidimensional in nature. For example, a choice of technology for mass transit needs to be linked not just to its carrying capacity, but also to costs, land requirements, energy intensity and several other factors. Mass transit systems need to be backed up by complementary transit-oriented development, the right kind of feeder systems and supporting public awareness campaigns. They need to be affordable for the poor yet be financially sustainable. They also need to be designed to accommodate the needs of women, children, the elderly, disabled and other vulnerable and marginalized persons in society. Thus, the approach should be comprehensive and holistic, requiring a combination of supply-side and demand-side measures.

The capacity for dealing with such a complex subject is generally lacking in the cities of the developing world. Very often institutional structures do not exist for coordinated planning, thus impacting the ability to secure the best options out of any investment. Legal and administrative frameworks to deal with the issue of capacity in an effective manner are not in place. Also, policy makers and political leaders charged with the responsibility and authority for dealing with this problem are often not from transport planning or urban planning backgrounds. Therefore, they have to seek expert opinions, which, at times, are conflicting.

Given the above, an effective and coordinated approach to dealing with urban transport would be beneficial if sound policies that mandate the direction that a government wants to take can be put in place. They would set the basic framework and lay down the "rules of the game" for downstream planning and project identification.

Few countries have formulated such policies, and in the absence of such a guiding policy, uncoordinated, unfocused and short-term interventions tend to be made. One of the key factors of this proposal is to draw some of the important issues that come up when formulating a policy for urban transport. For each issue, this proposal seeks to present the options that exist and suggest the factors that need to be taken into account in deciding between the options below:

- Current situation and problems of public transport;
- Analysis of public transport policies;
- Case studies of public transport of other countries;
- Future prospects of public transport;
- Vision, goals and strategies of public transport;
- Implementation plan for public transport facilities;
- Operation plan for public transport;
- Improving competitiveness of public transport; and,
- Implementation and financing plan.

12.3 Comprehensive Framework to Forge a Public Transport Policy

Public transport policies fall into three broad clusters: Avoid, Shift and Improve. While "Avoid" policies focus on reducing the need to travel, "Shift" policies aim at getting people to shift to more sustainable modes of travel, and "Improve" policies seek to reduce negative effects, such as fuel consumed or pollutants emitted per unit of travel. In general, a combination of approaches is adopted. However, the framework presented helps to understand the inter-linkages between the various actions. In each of these domains there could be four types of policy interventions: technology, price, regulation and persuasion, while effective policies require a combination of instruments of multiple types.

To start with, in simple terms, the objective of all our efforts is to improve accessibility to jobs, education, healthcare, etc. for all the residents of a city. However, there are barriers to this which need to be addressed. These require policies to reduce congestion, emissions, accidents, and energy use. There are two policy options for achieving these objectives: 1) reduce the growth in motor vehicle use, and 2) reduce the emissions per vehicle per kilometer of travel. In other words, we need to reduce the emissions from a motor vehicle for every kilometer it moves.

To reduce the growth of motor vehicle use, again, there are two policy options: 1) reduce the amount that people need to travel, i.e., travel demand, and 2) reduce the extent of personal motor vehicle use. One method of reducing travel demand is to reduce the number of trips that an individual needs to make, also known as the per capita trip rate. This can be done by actions such as reducing the number of workdays, increasing telecommuting, improving e-commerce and online shopping, and other

measures. A second way to reduce travel demand is to reduce the travel distance (or trip length), which can be done through mixed land use planning and securing higher urban densities. Reducing the reliance on personal motor vehicles can also be done by making other forms of travel more attractive. The two main alternative modes of travel for most people in cities are public transport and non-motorized modes of travel, such as walking and cycling.

Moving on to the "Improve" actions, this can be done through a combination of: 1) improved traffic flow, whereby vehicles move at a steady speed and idle less, 2) improving vehicle technology so that vehicles are more energy-efficient and consume less fuel per kilometer, and 3) improving fuel quality, whereby fuel emits less pollutants.

Improving traffic flow requires improved traffic management and better traffic engineering. When vehicles move in the same lane, but at different speeds, the slowest vehicle determines the speed of traffic. As a result, segregating slow-moving vehicles from fast-moving vehicles can help improve traffic flow. Similarly, having lanes for different speeds may help improve traffic flow. Traffic engineering looks at the design of the facilities that guide the movement of traffic. For example, poor-quality roads and poorly designed intersections or roundabouts can adversely impact traffic flow.

Vehicle technology improvement seeks to bring in new technology that would reduce the fuel consumed by vehicles. Improving fuel quality seeks to reduce the polluting nature of fuel, such as the sulphur content of diesel. Improving fuel quality could also mean looking at cleaner fuels like CNG or electricity. Thus, initiatives that help to introduce such cleaner fuel types would also help reduce emissions per vehicle km of travel.

This conceptual framework allows a policy maker to envision tradeoffs and make a choice between options. Any intervention can result in a box being positively impacted and others being negatively impacted. Public policy needs to assess these tradeoffs and decide on options that give the best overall outcome, and not piecemeal outcomes. Thus, it is through a comprehensive framework that a more holistic approach can be adopted to assess the impact of specific interventions. A comprehensive framework for public transport policy is shown in the figure below.

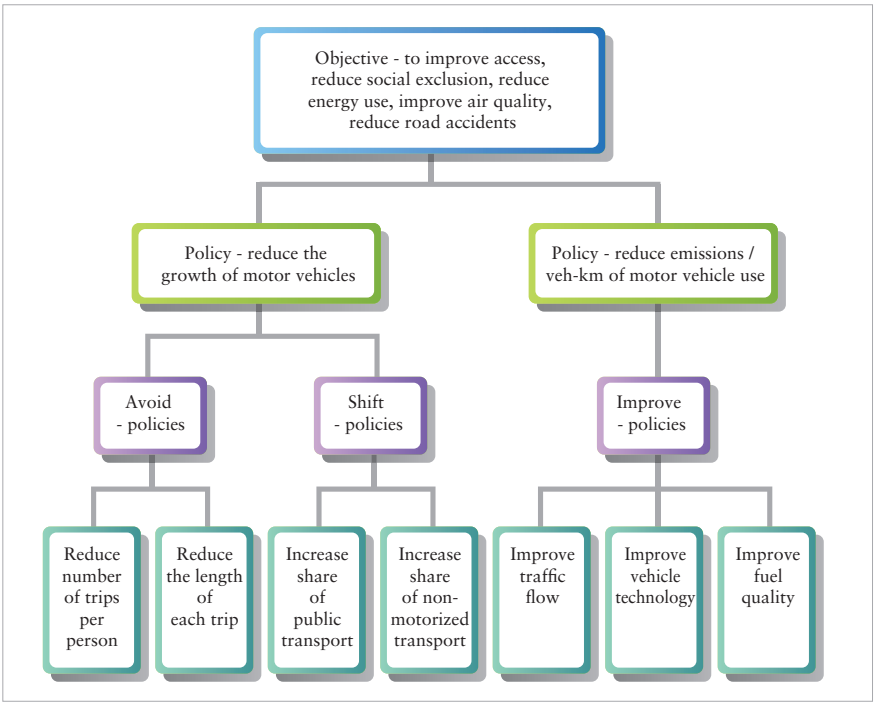

Figure 4.36 Comprehensive framework for public transport policy

12.4 Public Transport Road Map Development and Planning Implementation

The public transport road map sets out a pathway towards green public transportation, including how to address the critical success factors for different sectors, as well as the policies and practices that are needed for the transformation towards a livable city and prosperous economy.

A road map needs to result from the visioning, evidence, analysis and stakeholder engagement process. Therefore, a road map is also a pragmatic tool that provides a "to-do list" to move from the baseline to the public transport vision. The road map will include a timeline over which to implement changes based on the timing used in the scenarios. Bringing in different interventions together shows how a transition to livable city can be achieved.

As policies are implemented and practices change, it will be necessary to review the road map to ensure that it still represents the optimal path to

achieve the vision. The progress in achieving the vision should be measured.

Changes to policies and practices need to be implemented for the transition to a livable city to move from planning to reality. Exact implementation activities will depend on the interventions identified from the analysis and set out in the road map. The development of public transport systems is not instantaneous, but will require a transition with sequential actions. However, it is likely that the needs will include addressing the critical success factors, such as skills and knowledge, finance, analysis and evidence, policy, and collaboration.

The implementation of the public transport master plan will be implemented by the governments of ASEAN countries and cities; however, there is a range of implementation planning tasks that will greatly aid this process and that can be completed as part of this assignment.

The objectives of the implementation planning process are to:

- Further build capacity and create a capacity legacy plan
- Identify sources and methods of securing additional finance
- Identify how public-private partnerships (PPPs) can support objectives and projects if necessary
- Establish plans for knowledge and skills transfer associated with the policy programs identified

An implementation planning framework supports the public transport development road map. This document will address the issues above, in addition to specific issues that are raised throughout the stakeholder processes. The document will be written for the government as a guide to setting up the necessary arrangements to meet the objectives set out above. It will not be possible within the scope of this assignment to include full and comprehensive instruction on how to address all of the details and processes required. With increased capacity, the goal would be that the government representatives working on an implementation plan could use this document as a reference and signpost guide.

13. Utilization of Official Development Assistance (ODA)

Young-in KWON

It is strongly recommended for ASEAN countries to make a maximum use of foreign ODAs. In particular, they need to get both financial and professional help to expand public transit, such as LRT, MRT, and BRT. As an example, Korean ODA is introduced in detail for the reference of ASEAN countries and megacities.

13.1 Country Partnership Strategy of Korea

According to the Development Assistant Committee (DAC) Special Peer Review in 2008, the recommendation for completing the strategic framework for Korea's development cooperation was for Korea to build on its solid legal and policy foundations by completing the strategic framework to guide its growing development cooperation. One of the components of this recommendation was for Korea to complete and publish country partnership strategies that should align with partner countries' development strategies, cover all the Korean government's support, unify strategies for grants and loans, include forward expenditure commitments, incorporate plans and targets for aid effectiveness and define in measurable terms the objectives of Korea's contribution to each partner country.

Following the recommendations of the DAC Special Peer Review in 2008, Korea selected 26 priority partners. According to the Strategic Plan, a minimum of 70% of bilateral ODA was to be distributed to the priority countries for greater impact with a limited ODA budget. Korea devised new Country Partnership Strategies (CPS) for each priority partner country and used them as the basic guideline for delivering aid at the country level. In CPS, two or three core sectors are identified for each country to meet

the "select and focus" principle to enhance aid effectiveness. The CPS will be revised every three to five years for better alignment with the national development plans of the partner country.

The Prime Minister's Office devised the Formulation Guideline for CPS and designated a task force of concerned desk officers from the Ministry of Strategy and Finance (MOSF), the Ministry of Foreign Affairs and Trade (MOFAT), KOICA, Korea EximBank and other ministries for the formulation of CPS in each priority partner country. The Guideline specifies the full participation of the concerned stakeholders in the CPS-making process. Policy consultation with partner countries is also required at least twice during the whole process. By the year 2013, CPS for all 26 countries will have been completed.

The CPS plays a role in a number of sectors, including but not limited to the social, economic, political, environmental and health sectors. The CPS cooperates with a number of ASEAN countries, namely Vietnam, Indonesia, the Philippines and Cambodia, in the transportation sector, which is often interrelated with the economic, political and environmental sectors.

In Vietnam, one of the CPS' major areas of cooperation is economic infrastructure. In order to achieve economic growth, research is conducted to improve and modernize transportation infrastructure to serve as a foundation for this goal. The CPS focuses on strengthening the capacity of intelligent transport systems (ITS) and bus rapid transit (BRT) systems for road transportation by conducting master plan studies, sharing construction techniques, improving operation and management and hosting training programs for concerned stakeholders and officials.

Similarly, in Indonesia, one of the CPS' major areas of cooperation is the expansion of economic infrastructure. Much like the case in Vietnam, the expansion of road infrastructure and overall improvement and expansion of the transportation network serves as a foundation for the economic sector.

In the Philippines, one of the CPS' major areas of cooperation is transportation infrastructure. This entails improving transportation in metropolitan areas, expanding transportation infrastructure and strengthening capacity. There is a wide range of methods to conduct research in these areas, such as performing a development study of road and rail construction to secure a major city's traffic network, improving the logistic network of Manila, building on the public transportation system and introducing ITS to establish a strategy for an efficiently operated public transportation system. Additionally, one of the major areas of focus is

strengthening the connectivity of regions through transport infrastructure development, while keeping in mind the principles behind sustainable and balanced economic growth. Furthermore, for the provision of the aforementioned methods, it is important to take measures in strengthening capacity through expert training programs, exchange programs, etc. while also creating a research institute to establish a transport plan.

In Cambodia, one of the focus areas of the CPS is transportation and green energy through strengthening transportation infrastructure development, management, maintenance and capacity as well as rebuilding and improving upon the transportation infrastructure for regional economic integration and balanced national land development. The former calls for comprehensive capacity building through the establishment of a master plan, construction techniques, improved operation and management, and performing feasibility studies in large-scale transport sectors such as rail and aviation through grants which can later be implemented through loans. The latter calls for supporting areas that are lagging in terms of development, as well as improving accessibility by supporting national highway and expressway improvement projects.

13.2 Korean International Cooperation Agency

The Korean International Cooperation Agency (KOICA) is Korea's international funding mechanism for transport projects overseas. With an extensive network, including 46 offices in 44 countries, KOICA's headquarters is made up of a total of 10 departments and 28 teams.

KOICA has a large presence in the ASEAN countries, including Vietnam, Indonesia, the Philippines, Laos, Cambodia and Myanmar, and funds a number feasibility studies, master plans and other projects in these countries, as shown in the table below.

In order to apply to qualify for a KOICA project, the host country must fill out a project concept paper, coordinate with the host country's respective aid coordinating ministry, and submit the concept paper to the KOICA office, at which point the KOICA headquarters will assess the submission. A typical project concept paper includes the following items: project background, project objectives (short- and long-term), relevance with the national development plan of the country, project description (title, site/location, outputs, inputs, etc.), estimated project cost, project sustainability, project implementing organization, undertaking of host

countries (activities, inputs or project cost which can be borne by the host country), assistance of other countries or international organizations and an attachment of maps, budgets, etc.

Table 4.20 KOICA projects in ASEAN countries

Country	Project title	Year	Amount (US$ million)
Indonesia	Master Plan and Pilot System for Road Data Center Operation	2014-2016	3
Indonesia	Feasibility Study on Toll Road in Sumatra	2012-2014	3.5
Indonesia	Feasibility Study for Jabotabek Railway Circular Line Improvement	2011-2012	2
Philippines	Feasibility Study for the New Passenger Terminal and Master Plan of the Mactan-Cebu International Airport	2010-2011	1.1
Philippines	Master Plan of the Development of National Airports in the Philippines	2013-2015	2.5
Philippines	Feasibility Study on the C-6 Expressway Project	2010-2011	1.3
Philippines	Feasibility Study for the master Development Plan of the Diosdado Macapagal International Airport	2007-2008	3
Philippines	Feasibility Study on Construction and Improvement of Selected National Roads	2006-2007	1
Vietnam	Feasibility Study on Bus Rapid Transit (BRT) System in Ho Chi Minh City	2009-2012	2
Vietnam	Feasibility Study for Building and Electrifying New 1,433 mm Double-Track Gauge Hanoi-Vinh	2006-2008	1.2
Vietnam	Feasibility Study for Building and Electrifying New 1,435 mm Gauge Double Track from Sai Gon	2005-2007	0.9
Laos	Project for the Pavement Road Construction "Banlingxan Village" Thoulakhom District	2010-2011	1.5
Myanmar	Master Plan for Arterial Road Network Development in Myanmar	2013-2015	4
Myanmar	Feasibility Study for the Singapore-Kunming Rail Link Project in CLMV	2004-2007	1.2
Cambodia	Project for the Establishment of a Civil Aviation Training Center (CATC)	2013-2016	10
Cambodia	Road Safety Promotion for National Road No. 3 and No. 48 in Cambodia	2011-2013	3.2
Cambodia	Master Plan for Railway Network Development	2011-2013	2.8
Cambodia	Project for the Paving of SiemReap Bypass Road	2010-2012	11.5

13.3 Economic Development Cooperation Fund of Korea EximBank

The Government of Korea established the Economic Development

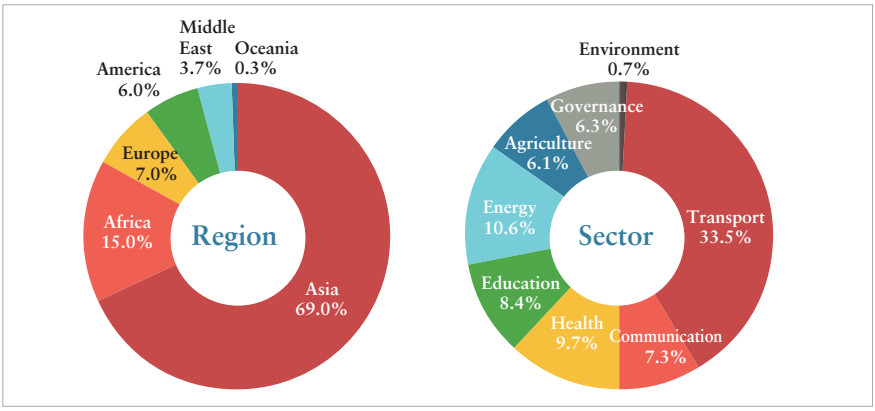

Figure 4.37 Distribution of EDCF regions and sectors

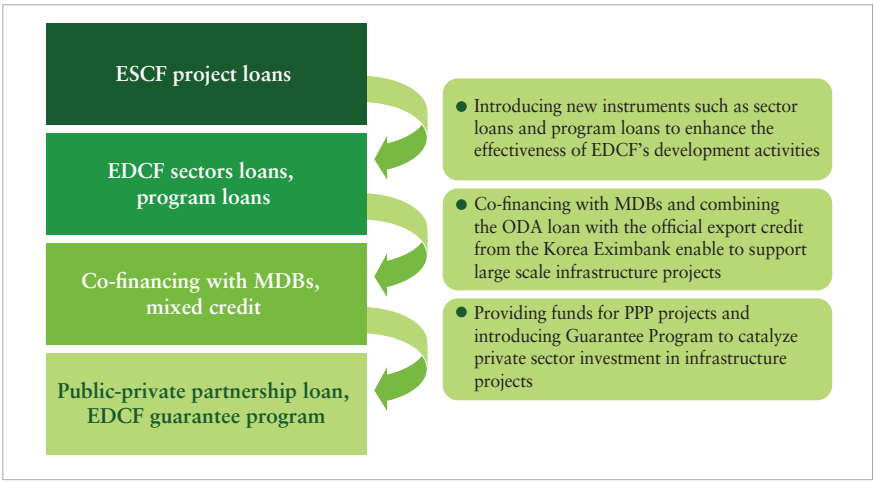

Figure 4.38 Types of financial instruments of EDCF

Cooperation Fund (EDCF) on June 1, 1987 with the purpose of promoting economic cooperation between Korea and developing countries. Drawing on Korea's own development experience over the years, the EDCF assists partner countries by providing funding for their industrial development and economic stability. The highest policy-making authority of the EDCF is the Fund Management Council, which is composed of 12 members, most of whom are ministerial-level government officials. The direction of EDCF operations and the assumption of principal policy-making responsibilities rest with the Ministry and Strategy of Finance (MOSF), which also coordinates policy matters with other relevant ministries.

Entrusted by the MOSF, the Export-Import Bank of Korea (Korea EximBank) is responsible for the administrative operation of the EDCF, including appraisal of projects, execution of loan agreements, and loan disbursements. Other duties include principal/interest payments collection, project supervision, and ex-post evaluation of project operations.

The EDCF has supported 294 projects in 51 countries. As of December 31, 2012 the accumulated volume of EDCF includes USD 8.5 billion, USD 3.6 billion, USD 0.5 billion and USD 3.1 billion in terms of commitment, disbursement, withdrawals and loan balance, respectively.

The EDCF regions are mainly focused in Asia, but have been expanding to assistance in Africa and other countries as part of a regional diversification strategy. The major sectors include economic projects, such as transportation, water management, energy, etc. and social infrastructure projects. The figure below depicts the distribution of EDCF regions and its major sectors.

To better utilize EDCF financial resources for supporting social overhead capital (SOC) projects, the EDCF is diversifying its financing instruments from standalone "Project Loans" to "Sector Loans, Program Loans," "Co-financing with multilateral development banks (MDBs)" and "Public-Private Partnership (PPP) Loans," as further described in the figure below.

13.4 Knowledge Sharing Program

Knowledge has emerged as an essential component of development cooperation. As the G20 Multi-Year Action Plan on Development notes, sharing development experience contributes to the adoption and adaptation of effective development solutions. Korea has transformed itself from an aid-recipient country to a donor country by achieving unprecedented economic growth within the past half century. From a war-torn country to the economic miracle of today, Korea has become the envy of most developing countries in its unprecedented economic growth.

Drawing from its own experience of learning from advanced countries, Korea recognizes "knowledge sharing" as an effective and innovative tool for economic development. As a result, the Ministry of Strategy and Finance (MOSF) of the Republic of Korea launched the Knowledge Sharing Program (KSP), a new paradigm of development cooperation, in 2004. It aims to share Korea's development know-how, assisting partner countries and working towards lessening the knowledge divide.

The KSP has three main objectives. The first is seeking solutions for current policy issues based on economic analysis and putting forth concrete recommendations for converting theory-based circumstances to actual situational solutions. The second is building and enhancing policymaking management and formulation capabilities, which entails building and enhancing the capacity of government officials and institutions for various consultation activities, as well as assisting in the implementation of KSP's policy recommendations. The last objective is nurturing mutually beneficial relationships by building close relationships through tangible and functional approaches to support partnership countries' economic development efforts.

The KSP's main consultation areas include economic development strategy, industrialization and export promotion, knowledge-based economy, economic crisis management and human resources development.

The KSP has worked closely in the sector of transportation, including two cases in Ethiopia and Mongolia. In the case of Ethiopia there was an improvement of the Addis Ababa City transportation system, in which the KSP established a working group with participants of related ministries and government agencies to draft a city transportation system development perspective based on the experience of Seoul, Korea and prepared a set of policy recommendations and strategies for improvement. In the case of Mongolia, the KSP supported the establishment of intelligent transportation systems by establishing an e-ticketing implementation plan for Ulaanbaatar and prepared a strategy for an e-ticketing system.

In order to apply to qualify for a KSP project, the applicant of the host country must prepare an official letter signed by the head of its organization stating its interest in participating in a KSP project, and then must submit the letter to either the Korea Development Institute (KDI) or the Ministry of Strategy and Finance through the applicant's local Korean Embassy, at which point the KDI will send a confirmation that the letter was received.

13.5 The Korea Transport Institute

The Korea Transport Institute (KOTI) was established in 1985 as the official transportation research agency for the government of Korea. The mission of KOTI is to provide recommendations and alternatives for the nation's transport policy and to create an optimal transport system through specialized research and technical innovations, while positioning itself as

one of the world's leading transport research institutions.

Since 2010, KOTI has strengthened its international position through cooperation with overseas institutions. Growing from only two international agreements each year up until 2009, KOTI had established and secured 61 agreements on international research by July 2013. While promoting innovative cases from Korea's transport sector, KOTI has made various efforts to enhance development countries' transport sector competence. In 2012, the World Bank introduced the Leaders in Urban Transport Planning (LUTP) Program in partnership with KOTI, with the goal to pass on Korea's experiences in rapid economic development to developing countries in Southeast Asia and Africa by discussing and sharing knowledge on transport policies, technology and operation expertise.

KOTI has been established as an effective research and cooperation institution with international organizations and major countries while pursuing projects to enhance the competencies of public officials in the transport sector in developing countries and furthering international cooperation.

14. Implementation of Transit-Oriented Development (TOD)

Changhwan MO

Transit-oriented development (TOD) is generally defined as moderate to high-density residential development that also includes employment and shopping opportunities and is located within easy walking distance of a major transit stop. Most ASEAN megacities such as Jakarta, Manila, Hanoi, Bangkok, Singapore, and Kuala Lumpur have a high population density in the urban center, but several megacities, such as Yangon in Myanmar, Vientiane in Laos, and Phnom Penh in Cambodia do not have such a high density. For example, Vientiane looks like a city in the USA because it clearly lacks public transit but is full of automobiles on the streets. To build a human-centered transport system for low carbon and green growth, ASEAN megacities need to implement the strategy of transit-oriented development.

14.1 TOD Elements

In general, TOD provides an environment where residents live within walking distance of a major transit station and other amenities. It is mainly designed to promote transit ridership and use through several different features. First of all, by living near transit, residents are provided with the opportunity to be connected to the entire transit network. "TOD aims to increase transit ridership and use, while granting access to more job centers, educational opportunities, and cultural facilities." (Arrington and Cervero, 2008, p. 3).

The spatial structure of urban development is principally shaped by major transportation systems. Automobile-oriented city development causes urban sprawl, increases travelling distances and lowers resource-

use efficiency. If their car-oriented transport policies continue, ASEAN megacities will lose precious time to change their spatial structure into an environmentally friendly one, because the car-oriented urban development is fixed. Since transit systems encourage a more efficient use of resources, ASEAN megacities should apply TOD policies to reshape the spatial structure of a city.

TOD could address various urban problems that ASEAN megacities face through traffic and urban development. These megacities are facing serious traffic congestion from a monocentric spatial structure and insufficient traffic infrastructure, resulting in a serious level of air pollution and greenhouse gas (GHG) emissions. TOD could provide an effective way of addressing traffic as well as environmental and energy issues in ASEAN megacities.

TOD planning elements are categorized into increasing population density, a residential and non-residential mixed ratio, and an increasing density of four-leg intersections, which creates a narrow street network. "The combination of TOD planning elements can lead to more benefits, as the increase of three TOD factors can bring about a 147-157% increase in benefits." (Park et al., 2011, p.203).

TOD planning and policies in high-density ASEAN megacities should be significantly different from those of low-density American cities. The application methods of TOD planning in these megacities need to emphasize not population density itself, but other TOD factors such as enhancing functions in transit centers, diversifying land use, and guiding pedestrian-friendly road networks. However, population density is still an important factor for ASEAN megacities since "the population density, employment accessibility, and in-town trip length to the CBD are the only factors that increase the modal shift ratio of public transportation in Bangkok." (Park et al., 2011, p.204). The increase of population density and employment accessibility can reduce the modal shift ratio of private passenger cars. This implies that TOD planning elements have a positive impact on the change of individual trip behavior.

To promote public transit in ASEAN megacities, a multipurpose concentration development around stations and stops with convenient transfer facilities and walking environment is essential. The mixed land-use strategy near a transit center as one of the TOD planning factors is still an important policy measure in attracting transit users. (Sung and Oh, 2010) It is also reasonable that convenient transfer facilities and a pedestrian-friendly walking environment around rail stations and BRT stops are

effective in increasing transit ridership at urbanized areas with high development densities.

The increasing accessibility of public transportation provides benefits to the traffic condition, energy and environment for ASEAN megacities. Also, the development density, among other TOD planning elements, can create traffic, energy, and environmental benefits by bringing about changes in trip behavior, and population density can bring about the reduction of vehicle use and increase in public transportation use. Thus, TOD planning in ASEAN megacities should be applied in accordance with population density, development density, and accessibility of public transit.

14.2 TOD Case in Hong Kong

Hong Kong provides a high level of public transport services, including a high-capacity railway, surface-street trams, double-deck buses and minibuses, and ferries. The combination of high urban densities and high-quality public transport services has not only produced the highest level of transit usage in the world, but has also substantially driven down the cost of motorized travel.

With the granting of exclusive development rights, the urban railway operator (MTRC) does not receive any cash subsidies from the Hong Kong government to build railway infrastructure. Instead, it receives an in-kind contribution in the form of a land grant that gives the company exclusive development rights for land above and adjacent to its stations. Due to this value capture development around stations, the urban railway operation company in Hong Kong can make a profit with a high level of fares.

The government of Hong Kong has also enjoyed financial returns and constructed a world-class railway network without having to provide any subsidy for the MTRC. “For the period of 1980–2005, it is estimated that Hong Kong SAR has received nearly HK$140 billion in net financial returns. In addition to the HK$140 billion figure for direct financial benefits, there are indirect benefits such as higher ridership through increased densities and reduced sprawl, air pollution and energy consumption.” (Cervero and Murakami, 2010).

14.3 Policy Lessons

Although TOD planning elements can increase the overall traffic, energy, and environmental benefits, diverse policy strategies should be reviewed thoroughly and applied cost-effectively. TOD strategies are categorized into zoning/planning, financing, and joint development and partnership. Zoning and planning can help TOD in many ways, especially via special zoning for station areas, "transit districts" and "transit villages," or specific site plans, through incentive-based zoning. Public agencies should consider their zoning powers as a form of value capture when considering how to encourage more diverse mixed-income and mixed-use TOD. The public agency responsible for planning and setting the zoning code should develop any transit-specific zoning jointly with the transit agencies, both bus and rail, that have facilities and routes within the area. This ensures that actual properties and rights-of-way will also be addressed in development.

TOD controls low-density and mono-purpose development and addresses the environment, traffic and energy issues through high-density mixed land use, focusing on public transportation. Narsi and Zhang (2014) also point out that living in areas with good transit accessibility along with other land-use characteristics, such as high-density development and a mix of land-use types, encourages people toward a more sustainable and healthy life with more transit use and less driving and eventually changes urban neighborhoods into more pedestrian and transit-friendly areas. TOD can be applied effectively in ASEAN megacities that have a relatively low modal share of public transportation. I strongly recommend that ASEAN countries extensively adopt TOD as a strategy for the improvement of public transit for low carbon and green growth.

15. Integration for Public Transportation

Changhwan MO

The integration of public transportation aims to secure the provision of an efficient, adequate, economical and properly integrated system of public inland transport and port facilities across bus, ferry, light rail and train services. ASEAN megacities need to integrate their transport systems for a significant increase in passenger convenience. This integration will siginificantly increase transit ridership in ASEAN megacities.

15.1 Steps and Barriers of Public Transport Integration

Integrated transport refers to these activities: The integration of public transport information, the physical integration of public transport services, the integration of public transit fares and ticketing, the integration of infrastructure provision, management and pricing for public and private transport, the integration of passenger and freight transport, the integration between transport measures and land use planning policies, integration between transport policies and other sector's transport policies such as education and health, and the integration between transport policies and the other sector's policies such as environment and economic development. ASEAN megacities should implement the easiest task of transport integration first. After that, they need to execute harder tasks incrementally. The steps of the integration process can be hierarchically ordered as below (Preston, 2012, p.7):

1. The integration of public transport information
2. The physical integration of public transport services
3. The integration of public transport fares and ticketing
4. The integration of infrastructure provision, management and pricing for public and private transport

5. The integration of passenger and freight transport
6. The integration of (transport) authorities
7. The integration between transport measures and land use planning polices
8. Integration between general transport policies and the transport policies of the education, healthcare and social services sectors
9. The integration between transport policies and policies for the environment and for socioeconomic development

An integrated network of public transport services has the benefits of more users, lower fares, higher frequencies, and higher levels of services. Adopting a microeconomic perspective, transport integration can be defined as: "the organizational process through which the planning and delivery of elements of the transport system are brought together across modes, sectors, operators and institutions, with the aim of increasing net social benefits, which includes environmental as well as social and economic impact." (NEA et al., 2003, p.17; Preston, 2012, p.9).

Limited control power of the government acts as a serious barrier for transport integration. In U.K., for example, local authorities have little input on rail services, even though the transport ministry retains administering authority over private rail operators. Further, local authorities have limited financial powers and have to apply for approval for major highway and public transport schemes, preventing them from making their own transport investment decisions. While local authorities lack a financial incentive to provide bus priority infrastructure, operators are reluctant to enter into any profit-sharing type arrangement to help finance such infrastructure.

The fragmented ownership of public transport systems and lines is another serious barrier to transport integration. For example, Tokyo subways have this separated ownership problem. The limited ability of local authorities to carry out transport priority measures also prevents partnership working in many areas. More importantly, separated authorities face a situation of divided responsibility, such as public transport and roads controlled by a local government, but parking and traffic policies controlled by another local government.

There are short-, medium- and long-term measures for progressing integrated transport. Short-term measures include the promotion of public transit with walking and cycling, and simple ticketing through public interventions, such as the successful network cards. (Fitzroy and Smith,

1994) Given the longer planning cycles, infrastructure improvements can be carried out in the medium term. The physical integration of local rail with other modes, including the implementation of tram and train technologies, has been developed in cities such as Kassel and Karlsruhe in Germany. (Axhausen and Brandl, 1999). Medium-term measures also include pricing integration so that both public and private transport systems have pay-as-you-go charging that reflects marginal costs. Global positioning systems, direct short-range communications, smartcards and mobile phones may provide technological platforms for such integration. The application of information technology should be encouraged, for example through funding for demonstration projects. It offers further possibilities for transport integration, including pervasive, multi-modal, real-time information and navigation and the development of demand-responsive services. Long-term measures involve changes in governance structures and policy practice. Integrated policy appraisal across sectors should be developed at a strategic level with an emphasis on the key economic, social and environmental objectives.

The creation of comfortable conditions for passenger leads to a situation where public transport is received by travelers as a more friendly and comfortable way of traveling and they are more convinced to use it. Several basic elements for interchange include: accessibility to different means of transport, infrastructure accessibility in transportation interchange, good information, understood signboards and explanation of passageways, sales and services offered in the area, rental services or different means of transport, additional services, e.g., luggage, toilets, cafe bars etc., short passageways, good conditions for walking, and short waiting time for changes. (Solecka, 2011).

15.2 Fare Integration in Seoul, Korea

In Korea, the public transport fare system was reorganized to impose a higher fare on long-distance travelers by designating a basic section and imposing additional charges at every distance. Also, it aimed to reduce the burden on public transport users who need to transfer. A transfer discount to reduce the excessive burden on transfer travelers was expanded to both bus-subway transfers and bus-bus transfers. The unified distance-based fare system was introduced to enable travelers to transfer to another mode of public transport without paying an additional charge. It can also benefit

Figure 4.39 Transport cards (Smart card) and card readers on a bus in Seoul

short-distance travelers who need to frequently transfer to another bus or subway. The Seoul City Government adopted a unified distance-based fare system, imposing fares by combining buses and subway trains, as well as a flat bus fare system imposing uniform fares on buses operating outside city limits.

The public transport unity fare is applied to all modes of public transport operating in downtown areas, and the fare is calculated based on basic fare plus unit extra fare (travel distance – basic fare distance) divided by extra unit distance. Seoul confirmed that the unified distance-based fare system was expanded to 10 km of the basic distance travelled by subway or bus regardless of the number of transfers and charges extra for every additional 5 km travel distance. The integration of public transport fares into the unified distance-based fare system was aimed to encourage the use of public transport based on lower fares and improve transparency in operating revenues.

16. Mobility Improvement for the Transportation Disadvantaged

Changhwan MO

It is strongly recommended for ASEAN countries to implement various policies to build up a human-oriented transport system that is a soft and warm transport system for the disabled, the elderly, pregnant women, persons with strollers, pedestrians, cyclists, and public transit users, rather than automobiles and motorcycles. To make a human-oriented transport system, ASEAN countries need to make a legal foundation to improve the mobility of transportation disadvantaged persons such as the disabled, the elderly, pregnant women, persons with strollers and young children.

ASEAN countries, due to the global economic recession and environmental problems such as climate change and air pollution, are facing an urgent situation to create a new transport vision based on transport rights and to realize it in practice. In particular, it is strongly proposed to meet the necessity for government to address the expansion of the poverty class caused by the recent economic recession and to encourage social inclusion through countermeasures for the transportation disadvantaged and poor people in ASEAN megacities.

Social inclusion is a new concept of pursuing the value of social equity and seeking unity and cohesiveness among social groups by resolving conflicts in the transport sector. The right to transport can be simply defined as "people's right to transport," and it is a right to ensure an appropriate transport mode for people who freely move and transport goods according to his or her willingness to do so. It is also the right of all people to move freely and safely, regardless of their economic, physical, social, or geographical barriers. It is a right to guarantee at least a minimum transport service for all people without considering their individual situation.

To realize the transport right in society, it is necessary for governments

to provide a basic transport service for the transport disadvantaged to ensure a minimum mobility right for low-income people, and to implement transport policies that guarantee a minimum transport service for people who live in a transport deficient area where public transit services are not provided at all. In addition, due to the increase of traffic accidents, it is necessary to implement specific policies that improve walking and the road environment so that the government does not infringe on the right of citizens to free and safe mobility.

The transport right should be positioned as a basic right based on a nation's constitution. First, the government has a duty not to interfere with the transport right of people. For example, due to a lack of mass transit and deficiency of walking and bicycle roads, the government should not directly or indirectly infringe on the transport right of citizens. Second, it is irrational that most transportation laws in ASEAN countries consider only the increase of automobile mobility rather than pedestrian mobility. Since the current transport laws of ASEAN countries seem not have a clear value judgment between pedestrians and automobiles, it becomes a threat to the transport right of citizens. Third, it is urgent to implement transport measures of social inclusion to relieve economic polarization with respect to socially neglected classes of people and to solve regional and sexual discrimination.

16.1 Act of Mobility Improvement for the Transportation Disadvantaged

In 2005, the Korean government made a legal foundation to improve the mobility of transportation disadvantaged persons such as the disabled, the elderly, pregnant women, and children, and Congress passed the Act of Mobility Improvement for the Transportation Disadvantaged.

The purpose of the Act was to contribute to the social participation of mobility disadvantaged persons and to the promotion of the welfare thereof by constructing human-oriented transportation systems through the expansion of convenient mobility equipment by means of transportation and passenger facilities and on roads, and through the improvement of the pedestrian environment so that mobility disadvantaged persons could travel safely and conveniently. In short, the Act was passed to make a barrier-free society so that the transportation disadvantaged could move freely and lead their lives as others do.

Figure 4.40 *Parking spaces for the disabled*

Figure 4.41 *Pedestrian road*

In order to guarantee the right to pursue the dignity, value and happiness of a human being, mobility disadvantaged persons shall have the right to transportation whereby they can safely and conveniently use all means of transportation, passenger facilities and roads without discrimination, which are used by persons other than the mobility disadvantaged persons.

The Act also established the role of government to provide transport services for the transportation disadvantaged. According to the Act, the Korean government is required to make a national plan of mobility improvement for the transportation disadvantaged, and to formulate a feasible plan for improving mobility facilities and the pedestrian environment. In addition, the five-year plan should develop a financing mechanism to meet investment plans. In short, the ultimate goal of the plan is to establish a human-centered transport system in Korea.

The Act defines the transportation disadvantaged as five types: the disabled, the elderly, pregnant women, young children, and persons with strollers. The disabled are disabled persons who have registered with the government, the elderly are over 65 years old, pregnant women are forecasted with the birth rate, young children are children between 5 and 9 years old, and persons with strollers refers to babies who are between 1 and 4 years old.

The Ministry of Land, Transport and Maritime Affairs (MLTM) reported that the ratio of transportation disadvantaged to the total population was 24.3% in Korea in 2007 (MLTM, 2009). Among them, the elderly composed 9.8% by total population, the highest percentage among the transportation disadvantaged. The disabled made up 2.8%, pregnant women 0.9%, young children 6.1%, and persons with strollers 4.7% by total population. It is forecasted that while the birth rate will gradually decrease, the number of elderly is going to significantly increase. To meet the demands of transportation disadvantaged persons, it is highly expected that the Korean government will improve transportation services for the transportation vulnerable.

The central government has examined and evaluated the condition of mobility facilities, which was based on the standards of the Act of mobility improvement for the transportation disadvantaged, as of 2007. According to the results of the examination, 67.6% of transportation modes were

Table 4.21 Conditions of transport facilities and environment

Type	Proper	Improper	No installation
Mode	67.6%	8.7%	23.6%
Facility	65.0%	13.9%	21.1%
Pedestrian Environment	40.9%	49.3%	9.8%
Average	57.8%	24.0%	18.2%

Source: Ministry of Land, Transport and Maritime Affair. (2009).

proper to the stated standards of the Act, while 32.4% were not proper. While 65.0% and 40.9% of the transportation facilities and pedestrian environment were proper, 35.0% and 50.1% were not, respectively. (MLTM, 2009).

Survey respondents stated the reasons for the inconvenience of mobility convenience facilities and the walking environment as follows. First, mobility convenience facilities have been constructed without considering the movement route of the transportation disadvantaged. Second, the condition of the pedestrian environment was poor. Third, the supply of mobility convenience facilities was not enough for the transport disadvantaged. Fourth, the maintenance of mobility convenience facilities was inept or inappropriate. The survey also showed that social recognition was seriously lack among people on the mobility needs of the disadvantaged in transport. Eighty-one percent of people did not, in fact, know the necessity of policy for them in the survey. In addition, respondents did sympathize with the necessity of not only promotion and education but also information and helper services for the transportation disadvantaged.

16.1.1 Barrier-Free Transport System

The vision of the five-year plan for the mobility of the transportation disadvantaged in Korea was barrier-free transportation. The strategies of the plan can be summarized as follows: a barrier-free pedestrian environment, development of mobility hubs in regions, increased accessibility of mass transit, provision of customer-oriented information services, social recognition of the transport disadvantaged, and R&D projects for mobility improvement. (MLTM, 2009).

- To make a barrier-free pedestrian environment, the basic direction is to remove barriers on pedestrian streets and to consider the movement routes of the transport disadvantaged. The details of the strategy are to improve the pedestrian environment, to construct pedestrian priority areas, and to establish a barrier-free certification system.
- To develop mobility hubs in region, the basic direction is to provide services and to focus on key stations and main corridors. The details of the strategy are infrastructure construction for mobility hubs, designation of key stations as mobility hubs, and service maximization of key stations and main corridors.

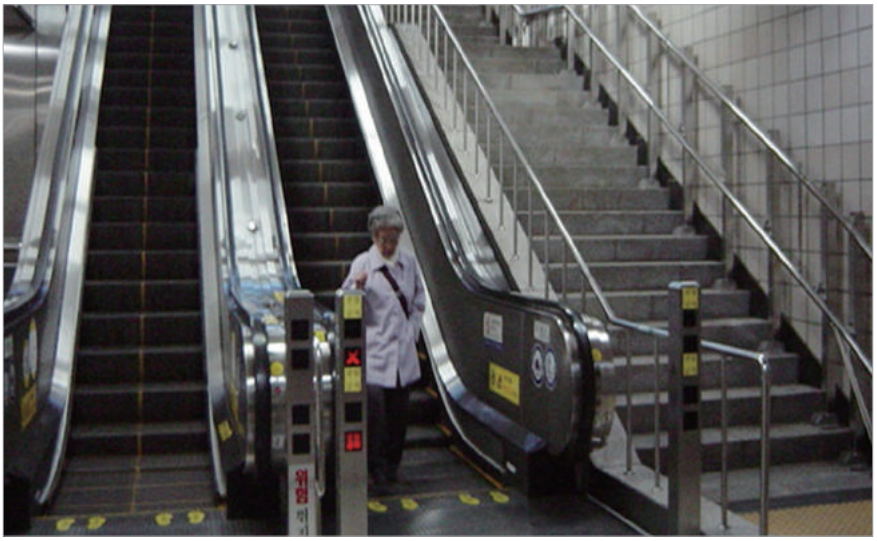

Figure 4.42 Escalator facility at an intercity bus terminal

Figure 4.43 Braille blocks and bus stop

- To increase the accessibility of mass transit, the basic direction is to emphasize the accessibility of mass transit and to construct elevators and escalators within rail stations. The details of the strategy are increased accessibility of buses, increased accessibility of subway and urban railways, and increased accessibility of airplanes and ships.

- To provide customer-oriented information services for the transportation disadvantaged, the basic direction is to provide customer-oriented information and helper services. The details of the strategy are an increase in para-transit services, collection and provision of transport information services, and provision of information services.
- To increase the social recognition of the transportation disadvantaged, the basic direction is to increase promotion and education for ensuring a consensus over a barrier-free transport policy. The details of the strategy are a systemic promotion for the change of citizens' views on the transportation disadvantaged and education programs on transport welfare policy.
- To increase R&D projects for mobility improvement, the basic direction is to increase R&D for the benefit of the transportation disadvantaged. The details of the strategy are to increase R&D projects for mobility and to support policy for the self-driving of the transportation disadvantaged.

16.1.2 Investment Plans

First, the Korean government was planning to provide a barrier-free walking environment for transportation disadvantaged persons. It was going to do cost-effective work first by the removal of barriers on walking streets for comfortable walking. At the stage of planning of buildings and cities, it would consider the mobility line of transportation disadvantaged persons. It also planned to renovate 210 km of national roads and 1,784 km of local roads to ensure a walking environment.

Second, the government selected key transport centers, such as stations and inter-city bus terminals that covered main mobility corridors, and provided concentrated services for the convenience of the transportation disadvantaged. It made a national guideline for local governments to follow when they selected and operated mobility hubs. It also made the mobility hubs barrier-free in terms of mobility, access, and use. The government was also planning to provide special transport services (STS) and non-step bus services for transportation disadvantaged persons.

Third, 9,130 non-step buses, 31.5% of all route buses operating in Korea in 2006, were planned to be supplied, and 31 bus terminals were also planned to be renovated. At subway and urban railway stations, elevators and escalators planned to be supplied to ensure at least one movement

Figure 4.44 *Persons with strollers in Denmark*

line that a transportation disadvantaged person could use in stations by himself or herself without another person's help. An additional 75 stations were planned to have at least one elevator for them. The government was also planning to make 3,340 bus stops around transportation centers, such as subway and railway stations and bus terminals, accessible to the transportation disadvantaged. The total cost for the improvement was 83.6 billion Korean won.

Fourth, there were 155 vehicles for STS or para-transit services in 2006, but the Ministry of Construction and Transportation (MOCT) expected they would be increased to 1,227 in 2011. The Korean government was trying to provide door-to-door services for transportation disadvantaged persons who had difficulties in using mass transit.

There are two types of vehicles for STS: vans and medium-sized buses. The Act required that a city or local government with a population over one million have at least 80 STS vehicles for transportation disadvantaged persons. It also required that a city or local government with a population between 300,000 and one million have 50 STS vehicles, and a city or local government with a population between 100,000 and 300,000 to have 20 STS vehicles. In addition to vehicles for STS, the Korean government was planning to construct mobility support centers that would be operated by a call system in each local government. The local government might directly operate the centers or contract out their operation to a private

Figure 4.45 *Wheelchair users on the street in Denmark*

Figure 4.46 *Wheelchair user and bus*

Figure 4.47 Elevator facility for subway

company or nonprofit organization. The government was also planning to construct a new website that contains all information for the mobility of the transportation disadvantaged.

Fifth, the Korean government planned to increase public promotion efforts so that it could change people's mindset about the transport disadvantaged. It planned to implement systemic promotions by utilizing the Internet, mass media, printed materials, and video news releases. Education is an effective tool to change people's views on public spending to improve the mobility of the transportation disadvantaged. Due to a worry over inefficiency, some people had a negative view of spending for the transport disadvantaged. Above all, the targets of education and training were managers of transport-related industries, such as bus companies, subway and railway companies, and bus terminal companies, and local public servants who were dealing with barrier-free tasks. Bus drivers would be also trained and educated so that they could provide high-quality services for the transportation disadvantaged. Children at kindergartens and at elementary schools were also the targets of education and training. Animation techniques would be used to make them interested in education materials. Education and training for traffic safety could be carried out with those for barrier-free policies.

Sixth, various R&D projects whose aim was to improve the mobility of the transportation disadvantaged were planned to be carried out. The

Korean government was going to develop a Korean standard model for non-step buses. In 2008, it planned to complete the development of a model for non-step buses. From 2009, it planned to widely supply local bus companies with the new non-step buses. It was also going to develop a new model of STS vehicle that was equipped with a wheelchair lift, driving facilities, and automobiles that could be used by transportation disadvantaged persons for self-driving. In addition, it planned to develop a standard model for bus stops that are accessible to transportation disadvantaged persons and develop a standard plan for pedestrian priority areas.

16.1.3 Ongoing Management

The government also made an ongoing management of the national plan. First, it evaluated local governments' performance to improve the mobility of the transportation disadvantaged, and planned to periodically measure the level of local governments' improvement efforts. Second, it established a consultative body for oversight of the implementation of the five-year plan and to provide professional advices for local governments. Third, it planned to monitor the performance of local governments' efforts so that it could get feedback to implement the five-year plan smoothly as was planned.

16.2 Transport Basic Law

In 2010, the Korean government attempted to enact the transport basic law, which distinctly stipulated the transport right of citizens and the duty for government to provide a minimum transport service for all people.[3] The government was trying to strengthen its role to provide transport services for socially disadvantaged citizens by enacting the law. The law aimed to protect the transport rights of all citizens, not limited to mobility handicapped persons, from social exclusion to the access to basic transport services due to geographical, physical, social, and economic barriers.

The realization of social inclusion in the transport sector would contribute to building up a human-oriented community that has high

3 The transport basic law was not passed in the national congress in 2010 due to conflicts of interest among stakeholders.

level of social capital. It is a key to provide a minimum transport service for all citizens rather than specific groups in society. The transport basic law includes clauses such as the transport right, basic values of transport policy, minimum service levels of transportation, promotion of public transportation, evaluation and performance management, and financing.

The right to transportation is the right to move freely and safely regardless of regional, physical, social and economic obstacles; this refers to the right of any individual to be guaranteed basic transport services to maintain one's dignity as a human being regardless of the circumstances in which they are placed. The actual implementation of the transport right would involve the execution of policies to supply minimum transport services to areas with poor transport infrastructure, including farming and fishing villages. It would also entail policies to provide basic transport services to the disabled and other mobility services to low-income individuals.

17. Enacting Laws for the Promotion of Public Transport

Changhwan MO

To support the implementation of public transport strategies, ASEAN countries need to enact laws for the promotion of public transit. I strongly recommend that they enact laws for the licensing, construction, and operation of public transit. Accordingly, they need to enact a law for bus licensing and operations and another law for licensing, construction, and operation of urban railways if those countries do not have them. For example, since Cambodia just started operation of city buses in Phnom Penh, it is essential for the country to establish a legal foundation for the promotion of public transit. For the references of ASEAN countries, I introduce the structure and content of Acts on the support and promotion of the mass transit system, bus industry and urban railways industry in Korea.

17.1 Act on the Support and Promotion of Utilization of Mass Transit Systems

The purpose of this Act is to provide for matters necessary to systematically cultivate and support public transportation and encourage people to use public transportation so as to enhance the convenience of transportation for people and the efficiency of transportation systems.

The term "public transportation" means a transportation system established by means of public transportation and public transportation facilities under this Act. The term "means of public transportation" means a transportation means falling under any of the following items, which is used to transport people in large numbers according to a specific route and operation schedule. Route bus urban and regional railroads are means of land public transportation. The term "public transportation facilities"

means facilities or structures falling under any of the following items, which are necessary for the operation of means of public transportation:

(a) Facilities or structures necessary for the smooth operation of route buses, such as bus terminals, bus stops, depots and exclusive bus lanes;
(b) Urban railroad facilities;
(c) Railroad facilities; and
(d) Transit facilities.

The State and local governments shall formulate and enforce policies for the matters in each of the following subparagraphs to cultivate and support public transportation to enable all citizens to use public transportation conveniently and safely:

1. Dissemination of diverse and new means of transportation, expansion of facilities and equipment, and strengthening of support for the improvement of public transportation services;
2. Improvement of public transportation services to span a wide area;
3. Development and dissemination of environmentally friendly means of public transportation;
4. Enhancement of convenience in transits between means of public transportation;
5. Strengthening of public transportation services in development promotion districts under the Balanced Regional Development and Support for Local Small and Medium Enterprises Act;
6. Strengthening of public transportation services in inland areas, islands, secluded areas and other areas; and
7. Provision of information necessary for the use of public transportation.

Every public transportation operator shall cooperate in the public transportation policies of the State or local governments and make efforts to improve services so as to enable citizens to use public transportation conveniently and safely. No citizen shall be discriminated against on unfair grounds in the provision of public transportation services, and they shall have a right to use public transportation conveniently and safely. Every citizen shall cooperate in the public transportation policies of the State and local governments and use public transportation in a manner that conforms to public safety and interests.

The structure of the Act is composed of five chapters: general provisions, formulation of a public transportation master plan, encouragement of the use and support of public transportation, research and survey and assessment of public transportation, and supplementary provisions.

17.1.1 Formulation of Public Transportation Master Plan

To formulate a public transportation master plan, the Minister of Land, Infrastructure, and Transport shall formulate a master plan for public transportation every five years, listening to the opinions of special metropolitan city mayors, metropolitan city mayors and provincial governors to cultivate and support public transportation and encourage citizens to use public transportation. The master plans shall include the matters in each of the following subparagraphs:

1. Current state and outlook of public transportation;
2. Basic directions for and objectives of public transportation policies;
3. Current state and target of rate of public transportation volume share;
4. Matters concerning the improvement and expansion of public transportation facilities and means of public transportation;
5. Matters concerning the provision of public transportation use information and public transportation informatization;
6. Current state of means of public transportation operating on unprofitable routes, adjustment of future operation and directions for support;
7. Matters concerning the encouragement of car owners to use public transportation;
8. Matters concerning the improvement of connectivity between the use of bicycles and the use of public transportation;
9. Matters concerning the enhancement of convenience of use of public transportation for residents of agricultural and fishing villages and secluded areas;
10. Measures for financing necessary for the promotion of master plans; and
11. Other matters determined by presidential decree for the improvement, encouragement of, and use of public transportation services.

The Minister of Land, Infrastructure, and Transport may demand the

submission of material necessary for the formulation of master plans from the heads of the relevant administrative organs of the central government, mayors and provincial governors and public transportation operators to collect basic data necessary for the formulation of master plans. In such cases, these officials shall comply with such demands, unless they have any special cause that prevents them from doing so.

17.1.2 Encouragement of the Use and Support of Public Transportation

To encourage the use and support of public transportation, the central government should implement these measures: Designation and support of a public transportation model city, financial support for the cultivation of public transportation, reduction and exemption of charges, support for restructuring of route passenger transportation businesses, certification of nationwide interoperable transportation cards, duty of public transportation operators, installment and operation of nationwide interoperable transportation cards, and measures for preferential passes for means of public transportation.

The State or each local government may provide subsidies or loans to local governments or public transportation operators for the funds necessary for a project falling under any of the following subparagraphs in whole or in part under the conditions prescribed by presidential decree in order to cultivate and encourage the use of public transportation:

1. Measures for preferential passes for means of public transportation;
2. Enhancement of the quality and diversification of means of public transportation, such as the introduction of low-floor buses;
3. Expansion and improvement of public transportation facilities, such as transit facilities;
4. Installation and operation of nationwide interoperable transportation cards; and
5. Other businesses determined by presidential decree to cultivate and encourage the use of public transportation.

The State and local governments may, when necessary for the cultivation of public transportation, reduce or exempt the development charges, alternative forestry resources charges, farmland preservation charges and alternative grassland charges under the conditions prescribed by the Restitution of Development Gains Act, the Management of Mountainous

Districts Act, the Farmland Act and the Grassland Act, respectively, to public transportation facilities that are passenger car terminals and depots made available to route passenger transportation businesses, which are public depots installed by the heads of local governments.

Each city mayor and the head of each "gun" shall, when he/she deems it necessary to encourage the use of public transportation and secure a smooth flow of traffic, take the measures in each of the following subparagraphs through consultation with the relevant administrative organs of the government for preferential passes for route buses and other means of public transportation:

1. Establishment of a streamlined bus transit system;
2. Turning junctions into interchanges, such as an overpass or an underground passage;
3. Establishment of a route bus-centered intelligent transportation system; and
4. Other measures determined by presidential decree to enable preferential passes for means of public transportation.

The Minister of Land, Infrastructure, and Transport may, when he/she deems it necessary to secure preferential passes for and smooth traveling on means of public transportation on a highway, request the commissioner general of the National Police Agency to install exclusive bus lanes. In such cases, the commissioner general who receives such a request shall comply therewith, unless he/she has any special cause that prevents him/her from doing so.

17.1.3 Research, Survey and Assessment of Public Transportation

The chapter on research, survey and assessment of public transportation includes these clauses: Promotion of public transportation technology research and development projects, survey of the current state of public transportation, assessment of public transportation policies, and business management and service assessment of public transportation business operators

The Minister of Land, Infrastructure and Transport may assess public transportation policies executed by local governments for the smooth flow of urban transportation and enhancement of convenience of transportation. With respect to local governments that achieve an outstanding result by assessing their public transportation policies, the State may, when such local governments conduct a business, preferentially provide them with financial

support under the conditions prescribed by presidential decree.

The Minister of Land, Infrastructure and Transport shall, when he/she assesses the public transportation policies of local governments, consider the matters in each of the following subparagraphs:

1. Formulation and performance of local public transportation plans and annual action plans;
2. Rate of public transportation volume share;
3. Expansion and improvement of public transportation facilities;
4. Connection between means of public transportation and connection between means of public transportation and public transportation facilities;
5. Public transportation informatization;
6. Level of public transportation services;
7. Reinforcement of competitiveness of public transportation; and
8. Other matters determined by presidential decree to cultivate and encourage the use of public transportation.

The Minister of Land, Infrastructure and Transport may demand the submission of data necessary for the assessment of public transportation policies from the relevant administrative organs of the central government and heads of local governments. In such cases, the relevant administrative organs of the central government and the heads of local governments shall comply with such demand, unless they have any special cause that prevents them from doing so.

The Minister of Land, Infrastructure and Transport shall, when he/she assesses the matters in each subparagraph of paragraph (3), do so by the categories of details of public transportation policy, actual results and future public transportation policy. Necessary matters concerning the detailed criteria for, method of, procedure for, etc. the assessment of public transportation policies shall be determined by presidential decree.

For the business management and service assessment of public transportation business operators, the Minister of Land, Infrastructure and Transport or each mayor or provincial governor may assess the state of business management of public transportation business operators and services provided by them to systematically support and cultivate public transportation and improve public transportation services. They may, after conducting a business management and service assessment, announce the results of the assessment (excluding the results of assessment of business

management) under the conditions prescribed by presidential decree.

With respect to those who have achieved an outstanding result by conducting a business management and service assessment, the Minister of Land, Infrastructure and Transport or each mayor or provincial governor may give a prize under the conditions prescribed by presidential decree and preferentially provide financial support. The Minister of Land, Infrastructure and Transport or each mayor or provincial governor may also demand the submission of data necessary for a business management and service assessment from public transportation business operators.

17. 2 Regulations on Bus Industry

The purposes of the Act for the bus industry are to promote public welfare by establishing order in passenger transport services and striving for the smooth transport of passengers and the overall development of passenger transport services.

17.2.1 Entry Regulations for Bus Industry

Passenger transport businesses are divided by two types: route and area transport businesses. An area transport business refers to a firm that transports a passenger after receiving a fare by a car at the request of him or her. A route transport business is a firm that transports a passenger in a fixed section where an automobile runs regularly. The passenger transport businesses are city, rural, village, and intercity bus transport businesses.

A city bus business is defined as a business in which passengers are

Table 4.22 Regulations for entry into bus industry

Categories of businesses	Method of entry
Urban and rural buses	License scheme
Airport buses	Temporary license
Metropolitan express buses (M - buses)	Temporary license
Village buses	Registration scheme
Intercity buses	License scheme
Chartered buses, special passenger automobiles, Rent a car businesses	Registration scheme
Passenger terminal businesses	License scheme

transported by vehicles within the operation routes of a metropolitan, wide-area, or single administrative area of a city. They are divided into the following in terms of their operation types: metropolitan express, wide-area, seat, and general. Rural buses are divided into three types: city-wide, seat, and general. Passengers are transported by vehicles with fixed operation routes within a single administrative area of a district. Village bus transport businesses are such businesses in which passengers are transported by vehicles with fixed operation routes where other transport providers have difficulties to operate due to the specialty of the starting and turning points, in a single administrative area of a city, district, or ward (gu), or that of the vehicles that are utilized for such operation. Intercity bus operations are divided into express, straight, and general types of bus operations for transporting passengers.

17.2.2 Licensing of Bus Industry

A person who intends to operate a passenger transport business must obtain a license from the Minister of Land, Infrastructure and Transport after drawing up their business plans. When giving a license for a passenger transport business, a competent authority should issue a license or a certificate of registration to a business operator. The businesses in which entry regulations have a licensing scheme are the city bus, rural bus, and intercity bus businesses.

When a competent authority receives a license application for a passenger transport business, it should assign a date to check the facilities and notify it to the applicant, if it acknowledges that the applicant meets the requirements of the license, after having examined its application documents. The authority should issue the license, when such facilities meet the criteria, after it has confirmed them at the specified date. In this case, the authority can license such a business, attaching conditions when deemed necessary to accommodate the establishment of local conditions and the transport order. The authority can ask a mayor or governor who has administrative control over the location of the facilities to confirm the compliance of the operation with such conditions. It should not grant the license if the authority does not acknowledge that the examined application documents comply with the license or the facility criteria or if the relevant applicant does not cooperate in investigation activities to confirm compliance with such criteria. In this case, the authority should clearly declare the reasons and notify them to the applicant.

In case of the grant of a license, the Minister of Land, Infrastructure and Transport as well as a mayor or governor, can impose a limit to the license regarding the period and range of services concerning passengers to be transported, if it is deemed necessary (called a "temporary license" below) or it can attach the conditions necessary to establish the order of the passenger vehicle transport business. A limitation to the license for route passenger vehicles transport businesses may be imposed in following cases:

First, the cases where route transport business operators have difficulties in operating route buses due to the peculiarities of passengers or irregularities in demand are divided into the following subclasses:

(a) Cases where it is deemed necessary to resolve the transport inconveniences of users of an airport, city air terminal, or international passenger ship terminal,
(b) Cases where tourist attractions are taken as the start or the last point and it is deemed necessary to provide conveniences for tourism,
(c) Cases where high-speed railways are taken as the start or the last point and it is acknowledged to be necessary to provide transport conveniences for their users,
(d) Cases where it is acknowledged to resolve the transport inconveniences of public transport users at commuting time zones or zones of late nighttime, which are established and notified by the Minister of Land, Infrastructure and Transport, and
(e) Cases where farming and fishing villages are taken as start and endpoints according to the "Basis Act on Farming and Fishing, their Villages, and Food Industry" and business operates flexibly in terms of operation, scheme, time, and frequency in response to the requests of their passengers, being subsidized by competent authorities.

Second, cases where the competent authorities provide routes with subsidization on the basis of statutes because route transport business operators avoid operating due to insufficient profits. Third, cases where cities and provinces have enacted ordinances to improve the bus transport scheme, such as the construction of bus exclusive lanes and the installation of operation schemes as defined in such ordinances.

Fourth, cases where one intends to manage the transport business for metropolitan express buses (M-bus) on newly created routes.

In cases where a temporary license is granted, the competent authority should select subjects for a temporary license for the route passenger

automobile transport business by announcing the matters of the temporary license such as frequency of operation, level of service, license terms, and subsidization openly. In this case, selection procedures and methods for transport business operators and target routes and other necessary matters are prescribed by the ordinances of cities and provinces (applicable only if mayors and governors grant the license). The period of a limited license is at most six years. If those who have been granted a temporary license intend to continue to run businesses after the expiration of the period, they are required to apply for a renewal contract three months in advance of the expiration date at the latest. However, the approval of a competent authority is required only if they want to establish or change the origin or destination of metropolitan express bus routes or operation schemes. If there are only changes in their business plans, declaring such change is sufficient.

Table 4.23 Number of vehicles by license standards for bus industry

Type of business	Number of vehicles by license standards by region			
	Seoul metropolitan city	Metropolitan city	City	Country
City bus transport business	40 units or more	40 units or more	30 units or more	-
Rural bus transport business	-	-	-	10 units or more
Intercity bus transport business	-	-	30 units or more	30 units or more

The license standards for passenger transport businesses are as follows:

(a) the business plans shall be suitable for transport demand and supply of transport capacity in the relevant routes and business areas, (b) the license criteria for the number of vehicles, which include a minimum license standard, held garage area, and incidental facilities must be met, (c) in the case of a private taxi transport business, additional criteria must be met, including whether there were transport accidents where the applicant was involved and if the applicant has the appropriate residency.

Table 4.24 Area standards of garages for bus industry

Type of business	Area per unit (at least)
Large	36-40 m^2
Medium-sized	23-26 m^2
Small	15-18 m^2

The competent authority may dispense with the number of vehicle unit requirement of the license standard when the application falls into any one among the following: cases where intercity bus transport service providers at the same time run a city bus transport business or a rural bus transport business, cases where operation routes or business areas belong to islands, out-of-the-way places, or other regions having special circumstances, and cases where only temporary licenses are granted. Besides such license standards, the authorities can determine separately detailed license criteria concerning transport demand and supply of transport capacity.

In addition, aside from the number of vehicle unit requirement following the license standard and the area standard of the garage capacity, operators are required to hold business and sales offices as their supplementary facilities, stops, garage equipment and additional facilities, waiting rooms, break rooms, and education and training facilities.

Table 4.25 Additional transport facilities for bus industry

Division	Facility standards
1. Business and sales office	1) Provision of office equipment and means of communication necessary for the performance of the passenger vehicle transport business, such as income and dispatch management. 2) Being installed where needed for its management, such as origin and endpoint of operation schemes and in the midst of the course of operation.
2. Stations	Installing stations in a location convenient for the use of passengers, but installing additionally ticket vending facilities, signposts, and the like.
3. Garage equipment and additional facilities	1) Garages have to be paved. 2) Garages have to be equipped with facilities that are able to be used for the inspection, maintenance, and washing of vehicles. However, in case that they are off-site or rented the requirement can be seen as fulfilled if it is recognized that there is no interference with the safety and dispatch of vehicles and other transport businesses.
4. Waiting and break Rooms	It is required to provide transport workers with appropriate facilities to wait and relax.
5. Education and training facilities	It is required to equip transport workers with facilities to educate them, such as on safe operation and service improvement, frequently.

17.2.3 Registration of Bus Industry

Those who intend to run bus operation businesses must make a business plan and then register it with the mayors of metropolitan cities, or governors of provinces. To these passenger transport businesses as objects

of registration belong town bus transport businesses and special passenger transport businesses.

Table 4.26 Standards for the garage capacity available for registration of bus industry

Type of business	Areas per unit (the lowest)
A. Chartered bus transport business	
1) Large	36-40 m^2
2) Medium-sized	23-26 m^2
B. Special passenger transport business	
1) Large-sized vans cars	36-40 m^2
2) Medium-sized vans cars	23-26 m^2
3) Small-sized vans cars	15-17 m^2
4) Passenger vehicles	13-16 m^2
C. Village bus transport business	
1) Large	36-40 m^2
2) Medium-sized	23-26 m^2

Garages should be the property of the business owners, but the following cases are exempted when transport operators enter into a contract to rent parking places in terminals as garages: Where operators use the land managed and operated by the state, local governments, government investment agencies, or government-sponsored agencies as a garage with their permission; where operators lease land (which includes a garage) owned by others for a term of more than two years and use it as a garage; and where operators conclude a contract to use a part of the parking place for more than two years.

17.2.4 Changes of Bus Industry Regulations

By establishing the "Automobile Transport Business Act" after the military coup d'état on May 16, 1961, all the former ordinances that had been in application until then were nullified. The reasons for the enactment of this Act were to establish order concerning the automobile transport business, to develop the automotive transport industry comprehensively and then to promote public welfare by doing so. The new enactment was to abolish and replace the old Joseon and Japanese Automobile Transport Business Ordinance. In this ordinance, automobile transport businesses were divided into automobile transport, automobile road, and automobile transport brokerage businesses.

The automobile transport businesses were classified into eight transport

businesses: charter passenger, taxi passenger, omnibus passenger, route truck, area truck, special and funeral automobile transport business. Those who intended to run these transport businesses were supposed to obtain licenses from the Minister of Transport. Intervention by administrative agencies concerning fares, clauses, and business plans were fairly widely accepted. The standards for the licensing were that business plans must be suitable to the standards for transport volume, as defined by the transport ministry ordinance, that the plans allowed a long-term management performance, that the operational plans held enough capacities and facilities to perform the business as planned, and that the starting of the businesses was necessary and appropriate for the public interest. For business transfers and acquisitions, mergers and dissolutions of a corporation, permission from the transport minister was required. And there were ordinances regulating prohibited behaviors of passengers and business operators and orders to improve their business.

As for the automobile road project, the transport minister and the director of the government office for Construction in the National Territory could grant licenses for the construction of automobile roads if such construction was been beneficial for the public and suitable to transport demands. Automobile road business operators had to fix fares and clauses and then obtain their licenses. The ordinance afforded the transport minister to make an order to improve the automobile road business when considered necessary.

In addition, those who intended to operate an automobile mediation business were to obtain a license from the transport minister, draft terms and conditions, and then obtain his approval. Those who intended to utilize private automobiles for freight transport and automobiles for more than seven passengers were obligated to declare such intention. Also, apparatuses for preventing the paid transport of private automobiles were prepared.

The "Automobile Transport Business Act" was revised in August, 1969. In the revision, automobile rental businesses were newly defined and stipulated as a type of business requiring licenses. Also, the scope of supervision of the administrative government agencies was fixed. In 1979, measures for the direct control of passenger businesses were taken. At this time bus business companies were separated and moment taxis appeared. In the same year, Seoul enforced a comprehensive measure for transport improvement and implemented policies, such as an increase in buses and taxies, a commute scheme that ordered different arrival times for work, a school district scheme, call taxis, and direct seat buses.

In 1981, the policy of directly managing truck automobiles was enforced. Although the government executed a policy of direct management three times from the time of the Japanese colonial forced occupation period until the end of the 1980s in order to improve the problem of the so-called "Jiip" scheme, this scheme, where private automobiles would be registered as the property of transport companies, has been continuing until the present day. In December 1981 the inheritance of an automobile transport business was permitted and regulations governing public welfare, education, work, and the uniforms of employees of transport companies were enacted, and a penalty surcharge scheme was newly established instead of a business suspension. The penalty surcharge scheme was first introduced in the automobile transport business through a legal amendment and was enacted to impose a financial burden instead of business suspension when a suspension disposal could not be made due to the public function of such transport companies.

In December 1986, some types of businesses among automobile transport businesses that had little relation to public transport were converted from a licensing scheme to a registration scheme to establish a basis for further liberalization. Additionally, the automobile road scheme, which had had no example for its enforcement since its legal enactment, was abolished.

In December 1989, automobile transport businesses were divided through their reorganization into automobile transport, automobile rental and automobile transport brokerage businesses. In August 1994, the fares and charges of some types of the businesses were converted from an approval scheme to a declaration scheme, and a management scheme for the taxi transport total income was introduced (the enforcement was in September, 1997). Penalty regulations for transport business employees were newly established.

To establish a legal scheme specifically concerning the freight automobile transport business, the freight transport part of the "Automobile Transport Business Act" was separated and the "Land Transport Promotion Act" and "Passenger Automobile Transport Terminal Act" were integrated into the now renamed "Passenger Automobile Transport Business Act." In this way, the automobile transport statutes were separated into the "Passenger Automobile Transport Business Act" and the "Freight Automobile Transport Business Act", and this separation scheme has continued until now in 2014. As a result of this revision, the passenger automobile transport businesses include only passenger automobile transport, car

rental, passenger automobile terminal, and passenger automobile transport businesses. Those types were divided into route, such as city, rural, village, and intercity bus, and area passenger transport businesses, such as chartered bus, special passenger automobile, general taxi, and private taxi.

According to this Act, the schemes which let authorities restrict registration because of the imbalance of transport demand and supply of transport capacity concerning the registered types of businesses such as chartered bus transport and special passenger automobile transport businesses were abolished. The barriers to entry concerning them were lowered, removing the provisions relating to minimum capital. In addition, they induced competition between companies and promoted the distribution of transport demand, instead of having prices be determined by the authorities, making transport operators discount and determine the fares or charges of the transport business in the range of a standard, which competent authorities established. Also, they let mutual aid associations be established as separate corporate bodies, separating mutual-aid projects that an association of businessmen had been running as a subsidiary enterprise.

In January 2000, as a result of a revision of the Act, the basis for the installation and management of the conflict adjustment committee for the mutual aid association was prepared. In December 2000, the operation of private automobiles, determining their routes for the purpose of attracting customers, was prohibited, in order to prevent bus public transport services from declining in functions. This measure was due to the route operation services of private shuttle buses of, for example, department stores and to obtain the security of their passengers. An exception was acknowledged for cases where they were operated for the users of schools, private schools, hotels, hospitals, facilities for education, culture, and physical education. They could be allowed to travel with the permission of a mayor or a governor when certain requirements were met.

The enforcement regulations of the "Passenger Transport Business Act" were revised in February 2004, so that a temporary license was to be granted (with a term of six years at most), when it was defined as the regulations of cities or provinces for the improvement of the bus transport scheme. Also, it was permitted to support passenger automobile transport operators financially.

In December 2005, to establish responsible administration and improve business efficiency in accordance with the era of regionalization, part of the authority of the Minister of Construction and Transport, like the registration of village bus transport businesses, was transferred to mayors

and governors, and part of the authority of mayors and governors, like the approval of transport by private automobiles for a fee, was transferred to mayors, provincial governors, and ward chiefs.

The enforcement ordinance of the "Passenger Automobile Transport Business Act" was amended in November 2008. To enhance the convenience of passengers who travelled long distances by bus, metropolitan express-type buses were introduced that could stop only at a maximum of four stations. The existing wide-area buses, which originally aimed to transport quickly over long distances, were not working well, because stations were increasing and the routes became bent like a snake, as operators were allowed to have up to half the station numbers of the seat-type buses on the relevant routes.

In this way metropolitan express type buses have been newly established in the operation form of a city bus transport business, and as a result, bent routes were straightened, and with minimized stations the satisfaction of long-distance passengers increased, and the activation of public transport was promoted. However, with the revision on the enforcement regulations in July 2011, the stop sections and stations that were severely limited to be within 5 km from their start and end points and within four in number was increased in number up to an additional 50% in consideration of local specialties and resident conveniences.

Those who had received a temporary license for a passenger automobile transport business were supposed to determine and declare charges or fares without being subject to the standards and fare rates stipulated by the Minister of Land, Infrastructure and Transport or mayors or governors. As for the metropolitan express city buses, there was a worry that the burden on passengers might increase if operators were to autonomously determine the fares in this way, even if they received temporary licenses for new routes of that business, because the operators could establish charges or fares much higher than the existing city buses.

Therefore, metropolitan express-type buses were exempted from the scope of those obliged to declare fares and were allowed to determine their fees within a standard and a fare range determined by the Minister of Land, Infrastructure and Transport, mayors or governors. For metropolitan express-type city bus operations, the fee determination authority was transferred from mayors or governors to the Minister of Land, Infrastructure and Transport so that the licensing and fare determination came from one hand.

In June 2012, the "Passenger Transport Business Act" was amended and

allowed rural bus transport business operators to be able to use small vans. Additionally, the provisions of the number of automobiles according to the license criteria for intercity transport business operators were partially moderated, and the secure standard of automobiles for the transport franchise business among its license standards was eased. The competent authority sets a framework to ensure the condition of flexible passenger transport in rural regions by permitting rural bus transport business operators to be able to use small vans in their business when it was acknowledged by the competent authority to be a necessity. The authority ensured that intercity transport businessmen who managed city and rural bus transport businesses together could manage their businesses flexibly by dispensing with the vehicle number requirement according to the license standard for intercity buses, within a range that did not exceed the 30% of intercity buses the operator owned, when they received an application for changing the business plan in which relevant intercity buses were converted to city or rural buses.

17.3 Regulations on Railways

17.3.1 Urban Railroad Act

The purpose of the Urban Railroad Act is to contribute to the development of urban traffic and the promotion of the safety and convenience of urban transport users by accelerating the construction of urban railroads, rationalizing their operation and efficiently administrating urban rolling stock, etc. so as to facilitate traffic flow in urban traffic zones.

This Act shall apply to the urban railroads referred to in the following subparagraphs:

1. Urban railroads constructed and operated by the State pursuant to this Act;
2. Urban railroads constructed and operated pursuant to this Act by local governments licensed to carry on urban railroad businesses, local government-invested public corporations established pursuant to the Local Public Enterprises Act (hereinafter referred to as "urban railroad corporations") to carry on urban railroad businesses, or other legal entities; and
3. Urban railroads constructed and operated by legal entities that are

entrusted by the State or local governments with the construction and operation of urban railroads.

This Act shall also apply in cases where tracks constructed by a person whose business plan is approved to meet the needs of his/her urban railroad business are not used for general traffic. The term "urban railroads" means railroads, monorails, trams, linear induction motors, magnetic levitation trains, and other traffic facilities and means of transportation using tracks, which are constructed and operated within urban traffic zones to facilitate traffic flow in urban areas

Basic Plan for Urban Railroads

If deemed necessary to construct and operate urban railroads within an urban traffic zone under his/her jurisdiction, a special metropolitan city mayor, metropolitan city mayor, provincial governor or the governor of a special self-governing province (hereinafter referred to as "mayor/provincial governor") shall develop a 10-year basic plan for urban railroads (hereinafter referred to as "basic plan") after consultation with other related mayor/provincial governors and submit it to the Minister of Land, Infrastructure, and Transport (hereinafter referred to as the "minister"). The same shall also apply to any change in such basic plan. The basic plan shall include the following matters:

1. Peculiarities and traffic conditions of the relevant urban traffic zone, and estimation of future traffic demand;
2. Appraisal of economic efficiency and feasibility of urban railroad construction;
3. Outline of rail lines, including the names and extension thereof, terminal stations, locations of stations, rolling stock bases, etc.;
4. Period of construction, and plans to raise funds, including the ratio of sharing expenses among related local governments;
5. Rough construction costs and mid- and long-term fund management plans;
6. Measures for road traffic in the relevant areas of urban railroad construction area during the period of construction;
7. Matters relating to the building of systems for intermodal transportation with other means of transportation;
8. Demand-supply program of manpower for urban railroad operation; and

9. Other matters recognized by the minister as necessary.

Upon receipt of a basic plan, the minister shall finalize the basic plan subject to deliberation by the National Transport Commission in consultation with the heads of relevant ministries and agencies after adjusting necessary matters, including the routes to be constructed, construction costs, plan for raising funds, including the ratio of sharing expenses among related local governments, period of construction, etc., and then publish the matters. The same shall also apply to any change in matters other than the minor matters prescribed by presidential decree.

Where any change is made to the matters relating to the construction costs or the period of construction in the basic plan, the change of business plan shall be deemed to have been approved.

Business Licenses and Licensing Standards for Urban Railroads

For business licenses, a person who intends to operate an urban railroad business shall obtain a license therefor from the minister, as prescribed by presidential decree. In granting a license for an urban railroad business, the minister may attach necessary conditions to facilitate urban traffic and promote the safety and convenience of users. Where a person licensed to operate an urban railroad business intends to transfer his/her urban railroad business or merge it with another business, he/she shall make a report in advance to the minister. Where a person licensed to operate an urban railroad business intends to suspend or close down his/her urban railroad business, he/she shall obtain permission in advance from the minister.

The minister shall make an examination of whether a business meets the following requirements if he/she intends to grant a license for that business:

1. The business shall meet the transportation demand of the urban traffic;
2. The applicant shall have the capacity to operate the business; and
3. The business shall have economic efficiency.

Where a person licensed to operate an urban railroad business intends to construct and operate urban railroads within the scope of a basic plan, he/she shall develop a business plan for urban railroads (hereinafter referred to as "business plan") and obtain approval from the minister, as prescribed by presidential decree. The same shall also apply to any change in such plan.

With respect to an application for the approval of a business plan, the

purport shall be publicly announced in advance and copies of the relevant documents shall be made available to the public for not less than 20 days. In such cases, the fact shall be notified to the owners of land incorporated into sites for the urban railroad facilities and the interested persons for public works; provided that, if the owners, etc. or their addresses are unknown or if a presidential decree otherwise prescribes, such notification may be omitted. Owners, etc. may present their opinions to an applicant for the approval of a business plan within the period of public inspection fixed. An applicant for the approval of a business plan shall reflect the opinions presented in the application if such opinions are deemed reasonable, and shall attach the opinions not yet reflected to the application. In granting approval for a business plan, the minister shall reflect the opinions if such opinions are deemed reasonable. The minister shall, upon the approval of a business plan, publish it in the Official Gazette.

17.3.2 Railway Transport Business

For the railway transport business, there are entry and fare regulations, as well as service and safety regulations. The basis for such regulations is as follows: Firstly, entry regulations are justified because, as businesses using facilities formed by governmental investment, it is natural to evaluate whether the business has the capacities and experiences that satisfy the standards set by the government. Second, fare regulations are necessary since the fares of railways as means of public transportation effect prices, and inasmuch as the government has invested in the facilities, it should be involved in the determination of prices.

The definition of the railway business is prescribed by the "Railway Business Act" and the "Urban Railroad Act". Above all, the railway business prescribed in the "Railway Business Act" is defined as "the business where one transports passengers or frights at a cost, using railway vehicles in response to the demands of others."[4] The same definition is prescribed in the "Passenger Transport Business Act"[5] and the "Truck Transport Business Act,"[6] only with the exception of using the words, "car" or "truck" instead of "railway vehicle."

However, according to the "Urban Railroad Act," the urban railroad business includes all works related to the railway infrastructure as its business scope.[7] This comprehensive definition of the urban railroad business can be found in the purposes[8] of the "Urban Railway Act" because this business has a variety of purposes, including the promotion of

construction of urban railroads, their operation and management.

On the other hand, the "Railway Business Act" has laws regulating business operators that are similar to the "Passenger Transport Business Act" and the "Truck Transport Business Act" in that it takes as its purpose development through the efficiency of the railway business and public welfare.

One difference between the railway and the automobile (transport) business is that the former is directly linked to the construction or the opening of the social infrastructure of railroads while the latter begins with the purchase of vehicles or their lease. Whereas car transport business operators do not actually own or manage roads as an infrastructure,

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4 Article 2 (Definitions) of the "Railway Business Act": 6. The term "railway business" means business that is run to transport passengers and freights by using railroad cars in return for compensation in compliance with the needs of other persons.

5 Article 2 (Definitions) of the "Railway Business Act": 3. The term "passenger transport business" means a business which transports passengers for profits using automobiles in response to the demand from others.

6 Article 2 (Definitions) of the "Truck Transport Business Act": 3. The term "truck transport business" means commercial business for carrying freight with compensation by using trucks in response to requests from other persons. In this case, if any shipper rides in a truck with his freight, the freight shall be inappropriate to be loaded into any automobile for passenger transport service in consideration of its weight, volume and shape, and necessary matters concerning standards therefore, and automobiles subject to such freight shall be prescribed by the Ordinance of the Ministry of Land, Transport and Maritime Affairs.

7 Article 3 (Definitions) of the "Urban Railway Act":
4. The term "Urban Railway Business" refers to activities falling under any of the following items:
a. Construction of Urban Railway facilities,
b. Transportation of passengers and cargo using Urban Railway facilities,
c. Repair of Urban Railway vehicles and operation control of trains, or
d. Development of subsidiary business and service making use of Urban Railway facilities, Urban Railway vehicles and Urban Railway land.

8 Article 1 (Purpose) of "Urban Railway Act": The purpose of this Act is to promote the construction of urban railways and rationalize their operation and efficiently manage urban railway vehicles, etc to decongest the traffic of urban transport areas, and thereby contribute to the development of urban transport as well as safety and increase in convenience of urban railway users.

railway transport businesses own railroads or manage them on consignment from the government. Ultimately, at least to this day, the possession or the management right consignment of railway facilities is necessary to establish a railway business in Korea.

Finally, the railway business is done in a monopolistic market system. The Railway Corporation is proceeding monopolistically with the business in the national railway networks, while relevant business operators in the urban railway business are working as their own respective businesses. Sometimes, in the case of some wide-area railway lines in the Seoul metropolitan areas, two business operators conduct business together due to their share of lines. But this can be reasonably seen to be close to a form of joint operation rather than a competitive one.

It is also a business where passengers and freight are transported with railway vehicles along assigned sections of national railway networks or industrial railroads. These businesses are divided by the principal agents of the railway construction: general, urban, and industrial railway business.

General railway business refers mainly to rail services in the trunk and branch lines of the national railway network. All railway businesses have been one of these types since the opening of the Seoul-Incheon Line in 1899. Then, in the early 1970s, subways began to be constructed and operated. The urban railways operated in major metropolitan cities are now a major part of the railway business. On the other hand, with the continuing industrial development, cement companies installed industrial railroads to transport their bulk freights and the freight transport. The freight transports using these railroads are under the responsibility of the companies that own the railroad facilities. Route 9 of the Seoul Metro and the New Bundang Route are operated by private companies. Also, the Gimhae, Uijeongbu, and Yongin LRT are operated by private business operators as private investment businesses selected by local governments and private investors. Following the construction of the Incheon International Airport Railway with private funds in the late 1990s, it had been under the management of the private sector but the KORAIL, a public rail company, has taken over the ownership and operation of the railway line.

Entry Regulations on the Railway Business

The railway business is where one transports passengers or freight at a cost, using railway vehicles in response to the demands of others. The railway business is a service providing mobility with either the main or branch lines of the national railway network.

The standards for the license of a railway business are as follows: It gives no risks to the safety of the railway traffic due to its business; its operation plans are suitable to railway transport demands; it contributes to transport capacity and supply; it is suitable to user convenience; applicants have the financial capability to perform its relevant businesses; and that the unit number, use period, and standard of railway vehicles used in the business are suitable to the criteria prescribed by the Ordinance of the Ministry of Land, Infrastructure and Transport.

Such license criteria appear to be examples of regulations, but key factors that hinder entry are actually the presence of the Korea Railroad Corporation and its status, along with the founding of the Railway Facilities Corporation in 2004, a system in which railway transport businesses holding railway vehicles could receive permission to use the railroad facilities from the corporation. However, railway-related institutions, technologies, and facilities were created with the Railway Corporation, which succeeded the Korean National Railroad Administration, at the center. For example, after a system reform in 2004, the control services, maintenance and repair of the rail lines were entrusted to the Railway Corporation. In addition, all the stations, which are core facilities to the business, are its assets, and the railway vehicle base and its related equipment also are classified as its assets. For this reason, it is practically impossible for any second or third railway business operator to enter the market.

Regulations on the entry to the urban rail business are also carried out with a licensing scheme. The Minister of Land, Infrastructure and Transport may attach conditions needed to smooth the urban traffic and to improve the safety and convenience for users when giving business operators a license. A person who obtains a license should declare in advance when transferring or merging their urban railway business. They are also required to receive permission from the minister in advance if they choose to close temporarily or shut down. In order to receive a license from the minister, the following three conditions must be met: the suitability of the business to the transport demand of urban traffic, the applicants' capacity of conducting its business, and it having economic validity.

Although entry to the railway transport business is possible if non-central governmental agents of urban and private railways take the lead in the railroad's construction, a particular person's entry into the business can be seen to be actually very restrictive in view of the considerably large scale of the investment in railway facilities.

Fare Regulations on the Railway Business

The standards for calculating the current railway rate, namely railway fares in connection with the rate regulations, are thoroughly centered on commercial expenses. Investment assets, which are not part of operating expenses such as interest expenses, losses related to foreign exchange, and loss of securities, are not subject to consideration. In consequence, unlike typical enterprises, the railway corporation, which provides rail transport services, has limited authority to make its own decisions on prices about its own products.

The railway fare system is a declaration scheme. Railway business operators are required to declare them to the Ministry of Land, Infrastructure and Transport. The same is true when trying to make any changes to the fares. When determining or changing fares, they must take into consideration its production costs and the charges or fares of other transportation means such as buses. Passenger transport, which means direct costs excluding costs for facility services related to passenger transport, should not exceed the upper limit of the passenger fares specified and noticed by the minister. The minister should consult with the Minister of Strategy and Economy in advance when appointing their upper limit. Railway business operators should put up a notice of declared or changed charges and fares in a noticeable place, such as a home page on the Internet, a relevant station, a sales office, or a business office.

Railway fares must be decided at the level where the total production costs required to provide railway transport services is compensated. The total production cost is the amount obtained by adding the proper investment rewards from genuine and efficient assets granted to the railway business, with the proper production cost that is required to provide rail transport services under the integrity and efficient management of its operators. The railway fares must form a system where the benefits of users and socio-regional special environments are taken into consideration so that the equity of burdens between the users is maintained and resources are reasonably distributed.

The fares of the urban railway are also under a declaration scheme. When determining or changing fares, operators are obligated to declare these decisions to a mayor or governor within the range stipulated by them. These decisions are to be made reasonably, ensuring fairness relative to the fares of other transport means such as buses. Also, they are required to take necessary measures, such as giving an advance notice of changed items, so as not to cause inconvenience to users.

The railway fares are being regulated in this way based on public character and exclusivity. Fares such as a toll, water charges, natural gas rates, electricity prices, airport charges, and the like, are regulated in a similar form. These public charges have roughly the same fixed characteristics of facility usage charges. On the other hand, railway fares are classified as public charges despite their relatively high rate of service costs among variable costs. This is because the railway is closely related to people's lives, such as the commute of citizens.

One of the features of the fare regulations in Korea is that its execution responsibilities overlap between different entities. In other words, apart from the competent authority (the Ministry of Land, Infrastructure and Transport), changes in the fare level in terms of price management are being regulated by consultation with the governmental department in charge of prices (the Strategy and Finance Ministry).

17.3.3 Changes in Railway Regulations

The railway business had been generally identified with railway construction. In other words, situations where railway construction, its maintenance, repair, and operations were performed as a single package lasted for a long time. This custom changed for the first time in the 2000s when the railway was defined as an "industry" and its full-scale development advanced.

The "Railway Act" enacted in September 1961 and enforced in January 1962 was the first ordinance for the railway transport business in Korea, in which the codes on passenger and freight transport, responsibilities of the railway business operators, railway protection, and its safety were included. The Act regulated the contents of "rational codes of conduct" for the railway business, its users and staff at that time and was limited to the purpose of smooth railway operations.

The "Urban Railroad Act" is a regulation that included revision and improvements to the "Subway Railroad Construction Promotion Act" (in 1979) that was made in order to promote construction of the metro in Seoul, as well as the improvement of the "Act on the Construction and Operation of the Metro" (in 1986) that complements the "Subway Railroad Construction Promotion Act" regulations on operations. It currently includes comprehensively all the regulations of the urban railways in Korea. It differs in its definition of other railway transport business as shown in article 2 (the applicative scope) of the Act. In the article, urban transport

business operators are defined as being established by a local government that received a license of that business; corporate bodies established by a special act, or by the "Local Public Enterprises Act"; or the other corporate bodies constructing and operating urban railroads by this specific Act (called the Urban Railway Corporation, as mentioned below). Railway business operators do not belong to the Korean Railroad Administration, but to organs specified in a master plan of construction. Yet, provisions necessitating a business license from the competent authority (the Ministry of Transport) had already existed.

The "Urban Railway Act" included articles on fare regulations from the beginning. Section 2, Article 15 of the Act of 1990 (with various provisions such as the declaration of fares) stipulated the regulation that the fares couldn't be separated from the equity with other transport means, and the enforcement rule of the same Act (the section 2 of Article 19) specified that they could not be differentiated from those of similar services. On the other hand, regulations on services were also carried out, as seen in the "Business Improvement Order" of Article 16 of the "Urban Railway Act" that laid out a system in which, besides the fares, the improvements of facilities such as business plans, transport clauses, and vehicles, as well as changes in the operation plan, such as operation time and frequency and also improvement in services concerning operations connecting urban railway lines could be demanded.

17.3.4 Policy Lessons

As mentioned above, all regulations on the railway transport business sector have been carried out under a clear rationale. In other words, they were drafted with the proper assumptions that state property should be used in the most reasonable way, the maintenance of cheap yet reasonable services should be encouraged, and any casualties and property damage should be prevented. Also, it would not be an exaggeration to say that these regulatory policies achieve their desired results. According to the regulation, persons external to the Railway Corporation are legally allowed to receive a business license and become railway operators of newly opened railway lines, but there were actually no new business operators besides facility investors as a result of the entry regulations.

It is known that the rail rates of Korea are on a lower level than that of other countries. The standard fare per travel distance in Korea is higher than in China, but it is one fourth of that of the United Kingdom and the

United States. The domestic railway fare is evaluated to be half the level of that of the main developed countries in the world.[9]

The entry and fare regulations of the railway industry raises the following question: Is maintaining a large-scale economy by keeping a governmental monopoly justified? The provision of services by governmental monopoly is seen as not being able to bring out the development of the railroad industry. The industry receded and relatively lost its competitiveness compared to other transport means such as roads. This is because it was not directly exposed to competition in island-like isolated regions due to the division of Korea and is maintained within the framework of governmental regulations.

In the early 2000s, attempts were made to separate the infrastructure and operations and to introduce competition in operations because of such problems. However, under conditions where competing operation enterprises could not enter the market, a competitive market system could not be established. For a new railway company to enter the market, vehicle rental and maintenance companies must compete independently of each other and free entry to railway stations and lines must be allowed. Yet current railway regulations do not allow space for new business developments and accessibility to the market. Even in operations, there is a fundamental limit to ensuring competitiveness as the monopoly of the railway corporation is allowed to continue. In order to resolve this problem, the introduction of competition through the deregulation of entry into the railway industry in the operation segment is needed.

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9 Purchasing power of GNI (Gross National Income) per capita (as of 2008): the World Bank (IBRD)

- Index of purchasing power of GNI per capita: national income converted into international dollars, using the PPP rate of national income per capita
- PPP rate: amount of currency needed in one country in order to purchase the same amount of goods and services which can be purchased for US$1 in the United States
- Railway fares: Homepages of railway operation institutions in each country (however, see Hankook Ilbo (daily newspaper) on 27 December, 2000 in the case of China
- Exchange rate: Application of 1,131 won / dollar (as of the Notice of the Exchange Bank on 30 March, 2010)

  As of 30 March, 2010 (However, in case of China, the business class at the time of the opening of express railway in December, 2009 is set as the standard.)

18. Enacting an Act for Low Carbon and Green Growth in the Transport Sector

Changhwan MO

To achieve the vision of building human-oriented transport systems for low carbon and green growth, ASEAN countries need to enact laws for low carbon and green growth in the transport sector. A law can be an effective tool to smoothly implement various strategies for improving public transportation systems in ASEAN megacities. For ASEAN public officials and experts on public transportation, I would like to introduce a Korean case of legislation, the Sustainable Transportation and Logistics Development Act, which was enacted in 2009.

18.1 Purpose and Basic Principles

The purpose of the Sustainable Transportation and Logistics Development Act was to provide for matters on the basic direction for policies on sustainable transportation logistics in response to changes in the conditions of transportation logistics, such as climate change, energy crisis and requests for environmental protection, and the implementation and promotion of such policies, so as to lay the groundwork for the sustainable development of transportation logistics for the present and future generations, and contribute to the development of the national economy and the improvement of national welfare.

The development of a sustainable transportation logistics system shall be promoted in accordance with basic principles falling under the following:

1. Promoting a low-carbon transportation logistics system by reducing emissions of greenhouse gases;
2. Promoting an environmentally friendly transportation logistics system;

3. Promoting a transportation logistics system which saves energy and resources;
4. Improving the mobility, accessibility and safety of a transportation logistics system;
5. Securing a balance between modes of transportation, classes and regions; and
6. Effectively connecting the use of land and a transportation logistics system.

The State and local governments shall formulate and implement comprehensive policies necessary for the development of a sustainable transportation logistics system. The State and local governments shall endeavor to take budgetary measures in an effort to fulfill obligations.

Transportation logistics operators shall actively take part in and cooperate in policies implemented by the State and local governments for development of a sustainable transportation logistics system.

All nationals shall have a right to comfortably and conveniently enjoy the benefits of a transportation logistics system as members of society. They shall strive for the development of a sustainable transportation logistics system in their daily lives, such as minimizing environmental deterioration caused by activities related to transportation logistics and saving energy. They shall recognize the importance of a sustainable transportation logistics system, and cooperate in the State and local governments' policies on sustainable transportation logistics, aimed at developing a sustainable transportation logistics system.

18.2 Basic Plans

The Minister of Land, Infrastructure, and Transport (hereinafter referred to as the "minister") shall formulate a basic plan (hereinafter referred to as "basic plan") for the development of sustainable national transportation logistics for a term of 10 years, so as to promote the development of a sustainable transportation logistics system.

The basic plans shall include the following matters:

1. The actual conditions of and outlook of energy consumption, emission of greenhouse gases, etc. related to transportation logistics;
2. Basic directions and objectives of a policy on sustainable

transportation logistics;
3. Measures for the development of a sustainable transportation logistics system, including popularization of mass transportation, development of environmentally friendly transportation logistics facilities and promotion of modal shift;
4. Measures for securing the financial resources necessary for promoting basic plans; and
5. Other matters prescribed by presidential decree for the development of a sustainable transportation logistics system.

The minister may request the heads of the relevant central administrative agencies, special metropolitan city mayor, metropolitan city mayor, provincial governor, governor of a special self-governing province (hereinafter referred to as the "mayor/provincial governor") and transportation logistics operators to submit data so as to collect the basic data necessary for the formulation of basic plans.

The minister shall, when he/she intends to formulate basic plans, draw up the framework of basic plans, hold consultations with the heads of the relevant central administrative agencies and the mayor/provincial governor and undergo deliberation by the National Transportation Committee. The minister shall, when he/she formulates basic plans, publicly notify such plans, as prescribed by presidential decree, and inform the heads of the relevant central administrative agencies and mayor/provincial governor of such plans. In such cases, the mayor/provincial governor shall send the basic plans to the head of a city/gun/gu under jurisdiction to make such plans available for the general public.

The minister shall formulate and implement annual implementation plans for executing basic plans each year. Necessary matters concerning the formulation, revision and execution of annual implementation plans shall be prescribed by presidential decree.

18.3 Local Plan

The special metropolitan city mayor, the metropolitan city mayor or the head of a local government shall formulate a plan (hereinafter referred to as "local plan") for the development of sustainable local transportation logistics for a term of 10 years after listening to the opinions of residents and the relevant experts, as prescribed by presidential decree, in an effort to

promote the development of a sustainable transportation logistics system in regions under jurisdiction, in accordance with basic plans; provided that, when they have formulated other plans on transportation, reflecting matters related to local plans, they are not required to separately formulate the relevant local plans after obtaining approval from the minister.

When he/she intends to formulate local plans, local mayors and heads shall consult with local governments in adjacent regions in advance. They shall also, when intending to formulate local plans, undergo deliberation by the Local Traffic Policy Deliberation Committee.

When they formulate local plans, they shall submit such plans to the minister, and the head of a local government shall submit such plans to the provincial governor (including the governor of a special self-governing province; hereinafter the same shall apply), as prescribed by presidential decree, before the local plans are finalized.

They shall, when he/she has received local plans, examine whether the plans are in accordance with basic plans, and may request the local mayors and heads to revise the local plans after deliberation by the National Transportation Committee or the Local Traffic Policy Deliberation Committee in cases where local plans include matters not in accordance with basic plans, or some matters are needed to be included in plans in order to maintain the connection and integration between local plans.

They shall, when he/she has received requests, finalize and publicly notify local plans reflecting such requests for revisions, and make such plans available for the general public, unless any extraordinary ground exists to the contrary. They shall formulate annual implementation plans for executing local plans each year. Necessary matters concerning the formulation, revision and execution of annual implementation plans shall be prescribed by presidential decree.

The State and local governments shall take into account the details of basic plans and local plans when they formulate plans on the use of land or transportation logistics under the relevant acts and subordinate statutes. They shall take into account the sustainability of a transportation logistics system in basic plans and local plans when they grant permission, etc. for projects concerning transportation logistics or the use of land, promoted under the relevant acts and subordinate statutes. Basic plans and local plans shall be consistent with a national basic strategy or local basic strategy under the Framework Act on Sustainable Development.

18.4 Promotion of Conversion to Sustainable Transportation and Logistics System

The State and local governments shall take measures necessary for reducing the emission of greenhouse gases by converting or adjusting transportation logistics systems in order to implement the United Nations Framework Convention on Climate Change. The minister shall develop a coefficient (hereinafter referred to as "greenhouse gas emissions coefficient") for calculating the emission of greenhouse gases per unit of transportation logistics in consultation with the heads of the relevant central administrative agencies, draw up the relevant data and promote a policy for the development of sustainable transportation logistics by utilizing such data. The minister may jointly designate and operate a dedicated organization to be in charge of a greenhouse gas emissions coefficient in consultation with the heads of the relevant central administrative agencies so as to efficiently develop a greenhouse gas emissions coefficient.

The minister shall calculate and announce the socioeconomic costs incurred by activities related to transportation logistics each year. The State and local governments shall preferentially consider socioeconomic costs and take measures to reduce such costs when formulating, implementing and evaluating policies on transportation logistics. The kinds of socioeconomic costs, details, methods and procedures for calculating costs and other necessary matters shall be determined by ordinance of the Ministry of Land, Infrastructure, and Transport.

The minister, local mayors and heads shall determine and manage total automobile traffic volumes on main roads, etc. within a transportation logistics zone under jurisdiction, as prescribed by presidential decree. The local mayors and heads may formulate a plan to reduce total automobile traffic volumes within a transportation logistics zone under jurisdiction below total automobile traffic volumes and conclude an agreement with the minister. In such cases, the minister may provide administrative or financial support to ensure that the local mayors and heads implement the agreement.

The State and local governments shall take measures to establish transfer or transshipment facilities and equipment so as to promote modal shift. The minister, local mayors and heads may recommend that operators and users of transportation logistics and consignors shift to effective modes of transportation.

The minister, local mayors and heads may conclude agreements on

modal shift with the operators and users of transportation logistics and consignors, and provide subsidies for them within a budget. Necessary matters concerning the standards and procedures for support, including the conclusion of agreements on modal shift and subsidies, shall be prescribed by presidential decree.

The minister may formulate and implement measures for modal shift, or request the competent local mayors and heads to formulate and implement measures for modal shift, in regions where the development of sustainable transportation logistics systems are undermined or are likely to be undermined. The local mayors and heads shall, upon receiving requests, formulate measures for modal shift, as prescribed by presidential decree, and submit such measures to the minister.

The minister, local mayors and heads may request that transportation logistics operators take the following measures in accordance with measures for modal shift:

1. Addition of modes of transportation, a higher frequency of operating modes of transportation and adjustment of routes;
2. Designation of alternative routes and transportation through alternative routes; and
3. Other measures prescribed by presidential decree for modal shift.

The State and local governments shall consider the following measures for supporting and promoting the utilization of mass transportation preferentially when formulating plans related to transportation or implementing development projects:

1. Formulating the objective of transportation-sharing of modes of transportation;
2. Preferential passage of mass modes of transportation under Article 10 of the Act on the Support and Promotion of Utilization of Mass Transit System Act;
3. Financial aid for supporting mass transportation under Article 12 of the Act on the Support and Promotion of Utilization of Mass Transit System Act; and
4. Other measures prescribed by presidential decree for supporting and promoting the utilization of mass transportation.

The operators of mass modes of transportation under subparagraph 4 of

Article 2 of the Act on the Support and Promotion of Utilization of Mass Transit System Act shall cooperate in the mass transportation policies of the State and local governments, and endeavor to improve services to help citizens comfortably and safely use mass transportation.

The State and local governments shall promote and support projects for developing environment-friendly transportation technology pursuant to relevant acts so as to promote the development of a sustainable transportation logistics system. The minister, the local mayors and heads shall take the following measures to expand the operation of environmentally friendly modes of transportation in consultation with the heads of the relevant central administrative agencies when deemed necessary for preventing global warming caused by greenhouse gases, etc. and creating comfortable transportation logistics conditions:

1. Support for environmentally friendly modes of transportation, including the reduction, etc. of fees for transportation logistics;
2. Preferential treatment in granting authorization or permission for projects related to transportation logistics for purchasers of environmentally friendly modes of transportation;
3. Other measures prescribed by presidential decree for expanding the operation of environmentally friendly modes of transportation.

The minister or the heads of local governments shall preferentially reflect the following matters so as to promote the development of a sustainable transportation logistics system, such as controlling transportation demand, when formulating urban planning under subparagraph 2 of Article 2 of the National Land Planning and Utilization Act or promoting urban planning projects under subparagraph 11 of the same Article:

1. Promotion of mixed-use development of residential, business, public or commercial facilities and arrangement of such facilities in a living zone to reduce traffic distance in a city;
2. Systematic expansion and use of non-motorized and carbon-free modes of transportation and mass transportation facilities so as to expand environmentally friendly transportation logistics facilities;
3. Prevention of disorderly urban sprawl to reduce consumption, etc. of transportation energy; and
4. Reorganization into an urban structure aimed at a sustainable transportation logistics system.

The minister shall formulate and publicly notify guidelines on building a city aimed at a sustainable transportation logistics system, including the following matters, so as to create urban conditions for a sustainable transportation logistics system:

1. Basic direction for and objectives of a sustainable transportation logistics system:
2. Indicators for managing sustainability;
3. Selection standards for and support of regions where a sustainable transportation logistics system is to be established;
4. Transportation demand management, such as controlling, etc. the use of passenger cars;
5. Creation of urban conditions focused on pedestrians, bicycles and mass transportation;
6. Arrangement and development of major facilities for building a sustainable transportation logistics system; and
7. Other matters prescribed by presidential decree.

The minister shall, when he/she intends to formulate guidelines on building a city aimed at a sustainable transportation logistics system, consult with the heads of the relevant central administrative agencies in advance. Any person who intends to formulate urban planning under the National Land Planning and Utilization Act or promotes an urban planning project shall, when he/she establishes or revises urban planning or promotes an urban planning project, comply with the guidelines on building a city aimed at a sustainable transportation logistics system.

The minister, local mayors and heads may restrict the use of automobiles in special areas for countermeasures, in consideration of automobile traffic volumes, emission of greenhouse gases or the level of traffic congestion. The minister shall, when he/she intends to restrict the use of automobiles, undergo deliberation by the National Transportation Committee after holding consultations with the heads of the relevant administrative agencies. Necessary matters concerning procedures and methods, etc. for restricting the use of automobiles shall be determined by ordinance of the Ministry of Land, Transport and Maritime Affairs.

18.5 Encouragement Wider Use of Non-Motorized and Carbon-Free Models of Transportation

The minister shall formulate comprehensive plans for encouraging the wider use of non-motorized and carbon-free modes of transportation (hereinafter referred to as "comprehensive plans") for a term of five years in order to reduce greenhouse gas emissions from modes of transportation using power, including automobiles, etc. and shift to an environmentally friendly and energy-saving transportation logistics system by increasing the transport share of non-motorized and carbon-free modes of transportation.

The comprehensive plans shall include the following matters:

1. Analysis of and outlook for non-motorized and carbon-free modes of transportation;
2. Basic direction for and objectives of non-motorized and carbon-free transportation policies;
3. Measures to increase the transport share of non-motorized and carbon-free modes of transportation;
4. Measures to develop non-motorized and carbon-free transportation systems and promote the use thereof;
5. Measures to secure the financial resources necessary for promoting comprehensive plans; and
6. Other matters prescribed by presidential decree to encourage the wider use of non-motorized and carbon-free modes of transportation.

The minister may request the heads of the relevant central administrative agencies or a mayor/provincial governor to submit blueprints for each jurisdiction, necessary for formulating comprehensive plans. The heads of the relevant central administrative agencies or a mayor/provincial governor, upon receiving requests, shall comply with such requests unless any justifiable ground exists to the contrary. The minister shall formulate comprehensive blueprints based on blueprints for each jurisdiction submitted, hold consultations with the heads of the relevant central administrative agencies and finalize comprehensive plans after deliberation by the National Transportation Committee. The minister shall, when he/she intends to revise comprehensive plans finalized, undergo deliberation by the National Transportation Committee after consultations with the heads of the relevant administrative agencies; provided that, this shall not apply to cases where minor matters prescribed by presidential decree are revised.

The minister shall, when comprehensive plans are finalized or revised, notify the heads of the relevant administrative agencies of the fact and make public notification thereof.

The minister or a mayor/provincial governor shall, when promoting projects for developing railway stations, bus terminals, harbors, airports, etc. prescribed by ordinance of the Ministry of Land, Transport and Maritime Affairs, secure facilities for connecting modes of transportation, transfer facilities or transshipment facilities, so as to minimize inconvenience in using non-motorized and carbon-free modes of transportation. The minister or a mayor/provincial governor shall check whether facilities for connecting modes of transportation are secured when granting authorization or approval of projects for developing railway stations, bus terminals, harbors, airports, etc. prescribed by ordinance of the Ministry of Land, Transport and Maritime Affairs. The standards for installing facilities for connecting modes of transportation shall be publicly notified by the minister after consultations with the relevant administrative agencies.

To promote a non-motorized and carbon-free transportation culture, the State and local governments shall promote policies such as education and public relations, as prescribed by presidential decree, so as to encourage the use of non-motorized and carbon-free modes of transportation.

For the basic direction of policies on pedestrian traffic, the State and local governments shall formulate and promote policies to encourage pedestrian traffic as a non-motorized and carbon-free transportation mode aimed at reducing automobile traffic volumes and the emission of greenhouse gases. The State and local governments shall, when establishing facilities influencing pedestrian traffic or promoting policies on pedestrian traffic, comprehensively take into account the convenience of mobility and accessibility for pedestrians, or the comfort and fine views of a pedestrian environment.

For the formulation of plans for improving pedestrian traffic, the local mayors and heads shall formulate such plans (hereinafter referred to as "improvement plans"), as prescribed by presidential decree, and the special metropolitan city mayor or the metropolitan city mayor shall obtain approval from the minister, and the head of a city/gun shall obtain approval from the governor of a special self-governing province. The improvement plans shall include the following matters:

1. Basic direction for improving pedestrian traffic;

2. Objectives of transportation sharing of pedestrian traffic;
3. Analysis of and outlook for pedestrian traffic;
4. Measures to improve pedestrian traffic; and
5. Other matters necessary for improving pedestrian traffic.

18.6 Designation and Management of Special Areas for Countermeasures

For the designation of special areas for countermeasures, the minister shall designate the whole or part of the relevant transportation logistics zones as special areas for countermeasures (hereinafter referred to as "special areas for countermeasures") for improving indicators for managing sustainability, when indicators for managing sustainability in transportation logistics zones meet the requirements prescribed by ordinance of the Ministry of Land, Transport and Maritime Affairs, such as frequent failures to satisfy the standards for managing sustainability, and therefore it is deemed difficult to maintain a sustainable transportation logistics system at an appropriate level.

The minister shall, when he/she intends to designate special areas for countermeasures, hold consultations with the heads of the relevant central administrative agencies, and the local mayors and heads undergo deliberation by the National Transportation Committee. This shall also apply to cases where he/she intends to revise designated special areas for countermeasures (excluding revisions to minor matters prescribed by presidential decree).

The minister shall, when he/she intends to designate or revise special areas for countermeasures, listen to the opinions of residents or relevant experts, as prescribed by presidential decree; provided that, this shall not apply to cases where minor matters prescribed by presidential decree are revised.

The minister shall, when he/she intends to designate or revises special areas for countermeasures, publicly notify the location and size of regions, date and purposes of designation or other matters prescribed by ordinance of the Ministry of Land, Transport and Maritime Affairs.

For the formulation and implementation of special comprehensive measures, the minister and the local mayors and heads shall formulate and implement special comprehensive measures for satisfying indicators for managing sustainability for special areas for countermeasures under

their jurisdiction. The special comprehensive measures shall include the following matters:

1. Basic direction for special comprehensive measures;
2. Implementation goals of indicators for managing sustainability;
3. Measures to manage total automobile traffic volumes;
4. Measures to improve transportation-sharing structures between modes of transportation;
5. Measures for transportation of large and heavy freight;
6. Measures for modal shift;
7. Measures for supporting and promoting the use of mass transportation;
8. Adjustment of fees for transportation logistics;
9. Measures for securing financial resources to promote special comprehensive measures; and
10. Other matters prescribed by ordinance of the Ministry of Land, Transport and Maritime Affairs for the formulation and implementation of special comprehensive measures.

The minister shall, when he/she intends to formulate special comprehensive measures, undergo deliberation by the National Transportation Committee after consultations with the heads of the relevant central administrative agencies, the competent local mayors and heads. This shall also apply to cases where he/she intends to revise special comprehensive measures.

The local mayors and heads shall, when he/she intends to formulate special comprehensive measures, obtain approval from the minister after consultations with the related special metropolitan city mayor, the metropolitan city mayor or the head of a si/gun.

The minister shall, when he/she intends to approve special comprehensive measures, consult with the heads of the relevant central administrative agencies, and when he/she has approved special comprehensive measures, he/she may notify the heads of the relevant central administrative agencies of the special comprehensive measures and request them to take necessary steps. In such cases, the heads of the relevant central administrative agencies shall comply with such requests, unless any justifiable ground exists to the contrary.

When the minister has formulated special comprehensive measures, or the local mayors and heads have obtained approval from the minister after formulating special comprehensive measures, he/she shall publicly

notify the fact, as prescribed by presidential decree, and notify the relevant administrative agencies thereof.

For transportation demand management in special areas, the minister, the local mayors and heads shall take the following measures for transportation demand management, etc. in special areas for countermeasures:

1. Collection and imposition of congestion fees under the Urban Traffic Improvement Promotion Act;
2. Collection and imposition of traffic congestion charges under the Urban Traffic Improvement Promotion Act;
3. Implementation of Projects for Intelligent Transportation System under the National Transport System Efficiency Act; and
4. Measures for a preferential passage of modes of mass transportation under the Act on the Support and Promotion of Utilization of Mass Transit System Act.

For the promotion of international cooperation, the minister shall formulate policies to promote international cooperation between the government, enterprises, universities, research institutes, other institutions, organizations, etc. of Korea and the international organizations or foreign governments, enterprises, universities, research institutes, other institutions, organizations, etc. in the area of sustainable transportation logistics, including policies on environmentally friendly transportation logistics, etc.

The minister may promote the following projects so as to promote international cooperation:

1. Survey and research for international cooperation in the area of sustainable transportation logistics;
2. International exchanges of human resources and information in the area of sustainable transportation logistics;
3. Opening of exhibitions and seminars in the area of sustainable transportation logistics;
4. Collection, analysis and distribution of information on the international regulations on greenhouse gas emissions, etc. in the area of transportation logistics; and
5. Other projects deemed necessary for promoting international cooperation.

18.7 Basic Act on Low Carbon and Green Growth

In December 2009, the Korean government enacted the Basic Act on Low Carbon and Green Growth to closely connect and integrate various measures separately pursued by a number of ministries to tackle the issues of climate change and global warming, new and renewable energy, and sustainable growth. The enactment of the Act helped lay the legal and institutional foundation for systematically and effectively pursuing the goal of realizing low-carbon green growth.

As the highest-ranking law on green growth, this Act presents basic directions to be pursued in various national sectors on the basis of nine fundamental principles for strategic national development. This Act is not only for the field of transport, but also for all fields in society.

As for transportation, this basic Act emphasizes the need to preserve the values of natural resources and the environment. At the same time, it call for reorganization of land, cities, architectural structures, and infrastructure such as transport facilities, roads, ports and water supply and sewage systems so that they can be efficiently used in endeavors to realize low-carbon green growth. The Act's main transportation-related guidelines are the control of greenhouse gas emissions in the transport sector and establishment of a low-carbon transport system.

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CHAPTER

5

Conclusion

Changhwan MO

1. Summary

This study addresses urban transport issues with the objective of promoting public transport in the megacities of ASEAN countries by directly investigating urban transport problems. The main objective of this study is to contribute to greenhouse gas reduction and low-carbon green growth by transferring Korean policy experiences to ASEAN countries.

This study has classified urban transport problems in ASEAN megacities by three types: common, policy, and implementation. The common problems are urbanization and motorization, traffic congestion, and air pollution, including GHG, while the policy problems are car-oriented transport policy, deficiency of pedestrian transport policy, underestimation of the role of buses, lack of utilization of BRT, and lack of public transit integration. Finally, the implementation problems of ASEAN megacities are lack of public financing mechanisms, lack of mobilization of private capital, no leading public transport organizations, no transport think tanks, transport database deficiencies, lack of planning capability, deficiency of legal foundation for public transportation, and lack of utilization of ODA.

The vision that this study set up is to build human-oriented transport systems for low carbon and green growth, and the goal to achieve the vision is to strengthen the public transport systems in ASEAN megacities. This study focuses on implementation strategies for improving public transit in ASEAN megacities and is not going to repeat proposing another master plan for public transit systems.

The strategies are classified by five groups: Financing, organizing, planning, phasing, and legislation. First, the financing strategies are the creation of special accounts for public transport, utilization of private-

public partnership (PPP), financing through value capture, and using donations from foreign agencies. Second, the organizing strategies are the creation of a leading public transport agency, that of transport think tanks, and construction of transport database with a DB center. Third, the planning and policy strategies are development of planning capabilities, integration of public transit, transit-oriented development, implementation of sustainable and pedestrian policies, and utilization of technology. Fourth, the phasing strategies are the expansion of the role of buses and implementation of two-phased development of mass transit from BRT to MRT. Fifth, the legislation strategy is to enact laws, such as laws for the promotion of public transport of public transport, an Act for transport disadvantaged persons, and an Act for low carbon and green growth in the transport sector, to support public transport strategies.

2. Public Transport Strategies for ASEAN Megacities

For ASEAN megacities, a special account for public transit based on fuel taxes as a stable financing mechanism is essential to construct and operate public transport systems properly for the welfare of citizens. Without it, it is almost impossible to provide adequate public transit services for those megacities. In particular, large megacities require about ten lines of MRT and LRT to meet rapidly increasing traffic demands. Both MRT and BRT are complementary modes, and it is not true that if one mode is chosen, another mode should be discarded. Special accounts for public transportation should be created with the three additional funding methods of PPP, value capture, and ODAs. When an ASEAN country uses a PPP to construct LRT, it needs to provide a partial subsidy for construction costs. That is the reason why, although a country is going to utilize PPP or value capture, it needs to have its own stable financing mechanism. In addition, both PPP and value capture can be used together for funding a public transit project.

A leading public transit organization in the central government is necessary to resolve conflicts among various stakeholders in addressing transportation issues. A central think tank for comprehensive transport research is required to politically and logically support public transit initiatives in ASEAN megacities. More importantly, a transport database center is required to have accurate transport database for planning and

policy-making.

A car-oriented transport policy cannot solve the urban transport problems at all in ASEAN megacities. To solve the problems, these megacities should make a human-oriented transport policy, such as sustainable and pedestrian policies, transit-oriented development, and integration of public transit. To develop planning capability, a country needs to construct a transport database. In addition, technology is also important to utilize for public transit. To enhance the public transport systems in ASEAN megacities, in particular, both buses and BRT should be utilized at their maximum.

It is also critical to enact public transit laws to systematically support the strategies in practice. For example, ASEAN countries need to enact laws on buses, urban subways, mobility improvement for the transport disadvantaged, and sustainable transport policy. Additionally, continuous commitment and political leadership for public transport should be used to enact fundamental regulations and legislation.

More importantly, there should be proper marketing for public transit to improve the image of public transport modes. ASEAN countries need to implement public transit investments at an appropriate time, because if a city's transport system is fixed as automobile-oriented, it is extremely difficult to transform the car-oriented system into a human-oriented one. The political and economic structure of that city or country is also not easily changing for sustainable transport policies.

Low carbon and green growth are key issues facing urban development today and the growing number of private vehicles in parallel with economic growth in the ASEAN region is of critical problem in terms of environmental sustainability. This project addresses urban transport issues with an objective to promote public transport in the urban areas of ASEAN countries by directly finding the problems of urban public transport in ASEAN cities, consulting ASEAN transport officials about the sustainable strategies of it at two workshops and with two published reports in English, and transferring Korean experiences and technologies of public transport to ASEAN countries so that they can build up a human-oriented and sustainable transport system.

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