

Chapter 2

Evolving Concepts in Urban Transport

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2.1 Introduction

Prevailing urban transport system in megacities is a combined result of dynamic interaction of institutions; the society's evolving need in mobility brought about by their changing physical, social, economic, and political environments; and the advancement in technology. The development of urban transport in cities involved a process of modernization and adaptation. European and American cities followed similar patterns of urban transport development up to the early twentieth century, and pursued quite different policy directions in the late twentieth century. Asian cities, on the other hand, followed a trend of adaptation in the past but gradually moved to locally adaptable systems.

This chapter discusses the evolution of urban transport concepts and the connections of these in the industrialized European and North American cities and East Asian cities. The chapter initially discusses some practical urban transport concepts in the USA and Europe after the dawn of the automobile in the late nineteenth century to the present. The discussions proceed to an overview of urban transport development in Asian cities. The last section attempts to draw broad policy implications and forward an argument that the special contexts of developing cities need to be carefully examined as the specialties may demand special policy measures rather than direct borrowing of concepts and lessons that evolved in the industrialized world.

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Why is it important to understand the evolution of urban transport policy concepts? There are two primary reasons that may explain the dynamics of transport policy development in cities. First, the basic time series characterization of urban transport policies in relation to the development of urban transport systems provides patterns that may potentially provide dynamic policy solutions for transport systems in Asian cities. Second, contextual understanding of the underpinnings of policies provides definitive cue points in introducing or reforming policies necessary for dynamic policy responses. The efficiency of solutions to urban transport challenges, measurable or qualitative, and policy responses to these problems can be evaluated through basic understanding of concepts. These policy lessons may provide useful insights for consequent policy development and decision-making practices in which the definitions of policy transitions are critical.

2.2 Development of Urban Transport System in the West

The development of urban transport policies has relatively been motivated by purposes that highly depend on the geopolitical characteristics of the cities and interest of the dominant political groups. Policies in the USA and Europe have set patterns on what transpired in the development of urban transport in the Pacific region. From the start of the imperial regime in the sixteenth century, urban transport technologies from the west were actively applied in settlements in colonial countries. In an effort to create livable settlements at par to their country's standard, cities in Asia were built without ample considerations if it matched at all the local conditions at that time. This section provides a very brief trend in the concepts that influence urban transport policies in the USA and Europe to set context in understanding the development of urban transport in Asian cities.

2.2.1 Emergence of Street Cars and Rail Transits

Roadways have been integral part of even the earliest civilization. The progression of road-building led to construction of road networks to support city functions that had also transcended time from trade to empire building, industry development, and supporting hierarchic settlement functions. Before the dawn of motorization, urban road traffic consists mainly of horse-drawn vehicles, carriages, and coaches. The maintenance of roads was usually done locally, and roads were more extensive in inter-settlement links. The late eighteenth century showed forth the new trend, which is mobility through self-propelled vehicles. The mixed traffic of early automobile and slower transport modes caused conflict in the use of road space, and it was responded through signaling system and horns. Various types of automobile propulsion systems were developed in the nineteenth century up to the start

of the twentieth century. These new faster modes had made significant changes in the urban transport system and city development. The subsequent growth of city prompted the needs for all-weather urban roads and urban transport system.

In Europe, many cities developed their tram systems from the late 19th century to early 20th century (Hall 1985). Larger cities also introduced underground metro and other high-capacity rail systems to serve increasing demands, such as London in 1890, Liverpool in 1893, Budapest in 1895, Glasgow in 1896, Paris in 1900, Berlin in 1902, Hamburg in 1912, and so forth. Tram, subways, and commuter lines formed a hierarchical urban rail system serving routes with different demand density and trip purposes. The urban rail systems had contributed to the compact urban forms in many European cities. However, as the city grew, it increasingly became difficult for the trams to support the mobility needs of people due to increasing demand and trip lengths. Congestion in the urban core started and travel speed deteriorated. To respond to the growing need for mobility in the cities, buses were introduced to complement trams. The increasing automobile traffic on the urban roads conflicted with the smooth operation of trams. This led to a policy shift toward endorsing new modes and grade separation. Economically more efficient modes, such as buses and underground trains or light rail systems, slowly replaced trams in the early 20th century.

Technological improvements in road vehicles put front issues on mismatch in infrastructure capacity and the existing regulatory measures. For instance, in Great Britain, during the early automobile age, specifications of existing roads as well as the traffic mixing with slower horse-drawn carriages constrained the capacity of the roads. On the other hand, the proliferation of motor buses after the war and its operation under the horse bus local licensing system became an issue. This made some conflict as the motorization of buses had expanded service into long-distance bus travel. The fixed-track urban transport system likewise received tough competition from motor buses, as it was more flexible to adapt to the changing urban mobility patterns, road congestion in the urban core, and land structure.

2.2.2 Period of Rapid Motorization and Road Investment

The popular use of automobile started right after the World War I when automobiles, which were at that time for the exclusive use of the military and elites, slowly became accessible to public. Many automobiles used in the war were sold, and motor buses and coaches were used for public transport services. Local authorities, who managed the tramways, usually assigned operations of the motorbuses in routes where tram services were lacking. Industrial revolution in the production of cars made cars easier to be acquired by public. Mass-produced and affordable car became increasingly available to masses. Model T of Ford Motors in 1912 was mass-produced in the USA, and the Volkswagen Beetle was introduced in 1938 dubbed as the “people’s car” in Europe (Grava 2003).

The construction of motorways was the initial solution of western cities to the growing use of cars after the war. Plans for rebuilding were centered in developing a road network based on traffic forecast identifying possible congestion points as well as linking major urban centers. The interaction of land use and traffic is the foremost concern of transport planners. Land utilizations were forecasted and planned, and their results used for the development of transport network. Economic and infrastructure growth in major cities became magnets of population and soon caused congestion within city bounds.

The sharp increase in the number of automobile, buses, and trucks from the end of the war up to the 1930s had placed a tremendous pressure on the development of road network. To cope with the increasing need to build roads, Great Britain put up a road fund in 1909 to absorb all gasoline taxes for the purpose of road improvement under the responsibility of local authorities. However, this road fund saw its early demise in 1937 following two main reasons—that the gasoline tax revenue had gone over the expected expenditure and that the trucks and buses were receiving subsidies that are detrimental to the railways, which were a strong lobby group at that time (Dunn 1978).

In the USA, the mid-1950s marked a car ownership growth that outpaced that of the economy. Car ownership in 1962 stood at one car per about two persons, a marked increase from a car ownership of one car per about five persons in 1948 (Owen 1966). Many urban transport policies like street development and provision of urban facilities like parking were promoted in response to the growing needs of motorists during the peak of motorization in the USA. The process of motorization had also led to the dissolution of streetcars from the 1910s to the 1960s in favor of motorbuses. As urban functions became more complex, and urban sprawl proliferated due to private motorization, the rail became an inferior mode to meet the new characteristics of mobility demand. Because of this, rail demand for commuters and freight movements decreased (Owen 1966). The difficulty of private transit operators to survive in the transport market, particularly after the 1950s, indicated the start of increasing involvement of the public sector in transport service provision. Public entities gave transit subsidies and managed district transit services. While the level of service of streetcars was still comparatively more economically efficient than the motor buses, the buses took more passengers because of service novelty at that time (St. Clair 1981).

Rapid increase in automobile use in the early twentieth century became the basis for transport policy planners to acknowledge the need for integrated planning of land use and transport. The fashion associated to the use of car was still dominant in the early twentieth century, which resulted in the decline in both nonmotorized transport and fixed urban transit system.

Road pricing became a popular policy response to deal with road congestion. A number of classic economic thoughts had influenced the concept leading to the pricing of road use (Button 2004). Among the earliest seminal discussion on pricing of road use was Dupuit's (1844) work on the supply of public goods. It took the optimal toll for a bridge as an illustration for diminishing marginal utility, directly implying that lower tolls mean more consumption. This was seconded by the work of Minard (1850) who

presented that the wear and tear of road has implications on congestion, and pioneered the discussions of the economic value associated to travel time savings, an important factor in evaluating marginal benefits. Moreover, Pigou (1920), in his book *The Economics of Welfare*, discussed about how roads are not efficiently utilized because users are not charged for the congestion they imposed on others. Various urban road pricing strategies have been implemented since the mid 20th century up to the present.

2.2.3 Disparate Views on Road Investment

From the 1950s to the 1960s, the great motorization in the USA and Europe had reached saturation levels straining urban road systems, causing obsolescence of road and roadside infrastructure, and setting off urban blight. This had placed great concerns not only on the local government but also on the central government. In 1954, in recognition of the need to upgrade and expand the highway systems to distribute the urban growth and decongest cities, the US Federal-Aid Highway Act of 1944 was enacted. It called for a federal cooperation in aiding the states to designate a national system of interstate highways to connect principal metropolitan areas, cities, and industrial areas. The consequent Federal-Aid Highway Act of 1956 provided the financial sources for state highway expenditure through federal earmark called the Highway Trust Fund, which sourced income from gasoline taxes and other automobile-related taxes. About 6,700 miles of urban expressway—including radial arteries, beltways, and downtown loops and bypasses aiming to decongest central business districts—composed about 45% of the total federal-aid highway spending (Owen 1966).

Urban road investments made by the local government also increased to meet the demand for roads, different local government-adopted revenue-raising from local taxes like motor vehicle taxes, and property taxes. These road-building thrusts were matched with policies to encourage private development of off-street parking or perimeter parking when transit lines were available. Even with these new solutions to accommodate traffic, heavy peak-hour congestion persisted in many cities in the USA. The early 1960s also saw the decline in the patronage of public transit. Financial losses incurred by public transit operators continued in many cities because of decreasing market share brought about by private car. As there were also no incentives for improvement, bus services deteriorated immensely. The government, both federal and local, came in aid of the public transit operators by providing tax reliefs and capital grants (Danielson 1965). Many institutional changes, both in bus and rail service industries, were introduced at this time.

In the 1960s, Britain plans for urban motorways were being abandoned. The historic Buchanan report in 1963, which opened up a debate on the balance between road spending and road traffic in the interest of environmental standards, became widely popular in Europe (Buchanan and Crowther 1964). This, along with other discourses on the effectiveness of road investment in managing transport system,

was widely accepted in the region. The report highlighted how environmental impacts of cars in urban areas can be reduced by urban motorways and flyovers. Likewise, land-use and transport-planning integration was highlighted by the report.

In German cities, investments in urban transport systems were started in 1967 when local authorities subsidized public transport with parts of motor fuel tax revenues (Hall and Hass-Klau 1985). Urban renewal in city centers was done through massive pedestrianization in city centers, construction of underground systems, exclusive trams and busway lanes, park and ride systems, and the formation of united transport authorities in major conurbations.

The position whether to build or not to build roads is a well-debated topic that has started in the 1960s and had proceeded to bear a number of supporting discussions and counter arguments. In his book, Leeming (1969) discussed that construction of roadways will generate induced demand. He argued that the creation of new roads aimed to decongest network generates unnecessary trips and causes urban sprawl. Downs (1992) further argued that the investments in expressways results in three-pronged convergence. First, motorists who use road options in peak hour will switch to expressway; second, many drivers who formerly traveled just before or after the peak hours start traveling during those hours; and, third, some commuters who used public transport during peak hours will now use private cars on expressway.

2.2.4 Revival of Public Transport

After concentration of huge postwar investments in road in the mid-1960s, urban development called for more socioeconomic considerations like the services for the urban poor. Urban mass transport interests, which had remained less vocal than the powerful automobile lobby in the USA, started to form mass transport coalition in 1971 (Smerk 2008). Further, the oil crisis and increasing environmental movements in the 1970s started to favor public transport over private cars. Groups advocated “balanced transportation system” which in a broad sense meant more funding for transit and less for road (Dilger 2003). However, funding for mass transit, particularly federal, was a controversial issue as mass transit benefits were believed to be of localized in nature. Despite the apparent advantages of the high-capacity railway system, there were concerns that the cost of route was related primarily to its capacity rather than its utilization (Joy 1973). In addition, emerging belief that the high fixed cost of rail may go beyond its potential benefits of volume reduction affected views toward railway policy (Joy 1989). Nonetheless, in the wake of visible problems of increasing motorization, western cities geared up their effort to revive public transport. In 1961, the first ever direct federal aid for urban mass transit was authorized in the USA. Even under the Regan administration, which is known more for liberalized market reform, public transport received due attention as provision was made to allocate part of earmarked revenue from gasoline tax as a

federal grant for transit investment (Altshuler and Luberoff 2003). European countries, such France and Germany initiated more concerted policy efforts to revive public transport earlier, while Britain joined the league a little later in 1990s (Hall and Hass-Klau 1985; Banister 2002).

2.2.5 Institutional Reforms in Public Transport

Conventionally, public transport service is financed using public sector resources. For instance, the development of suburban rail in Germany was more extensive compared to other European countries like the UK because of the earmarked funds available for rail investment and the federal government's willingness to carry burden of operational subsidies (Nash 1985). Verkehrsverbund, which is a system for organizing public transport service, has emerged as a highly effective way of coordinating fares and services without direct ownership of any transport mode. In US cities, financing mass transport system became a big challenge as self-financing was difficult because of the tendency for public policies to keep public transport charges low and put transit authorities at a drawback. Financing issues associated to public transport service provision has brought about institutional reforms in the transport sector.

Deregulation and privatization of the public transport services were adopted by some European countries in the 1980s. In 1986, bus deregulation was introduced in the UK as part of the Transport Act 1985. It was based on the "Buses" White Paper, which proposed deregulation of local bus services in the country except for Northern Ireland and Greater London. The paper also put forward the abolition of road service licensing and introduction of competition on local bus services. The deregulation of buses in the UK was believed to have caused the increase in the number of minibuses (Banister and Mackett 1990).

In Greater London, the Greater London Council (GLC), which has the responsibility for public transport, was abolished in 1986 in place of the London Regional Transport (LRT), which was under direct state control and reported to the Secretary of State for Transport. The LRT established subsidiary companies to run the public transport services like its wholly owned London Underground Limited (LUL) for the subways and the London Buses Limited (LBL) for the buses, which was formed mainly to privatize bus service. London Transport, operator of urban bus service in Greater London, was converted to a tendering authority for route contracts. Its bus operating interest and assets were divided into 12 competing business units under the name London Buses. They became private operators themselves from 1994 to 1995. Subsidy control was implemented by allowing bus companies to offer commercial bus service, which has no subsidy but has no restriction on fares (Banister 2002).

2.2.6 *Concept of Sustainable Transport*

The concept of sustainable development, which started in the 1980s, is premised on the concept that present and future generation should equally benefit from the entitlements of nature. The most used definition of sustainable development is “development that meets the needs of the present without compromising the needs of the future generation to meet their own need.” This definition is what the World Commission on Environment and Development (WCED) otherwise known as the Brundtland Commission set forth in its report “Our Common Future” published in 1987. The concept became popular and was adapted in many cross-sectoral development literatures from 1988 up to the present. Sustainable transportation is among the derivative terminology from this concept. The focus of many definitions has been intergenerational equity through the use of more energy-efficient fuel and reducing environmental externalities of traffic such as congestion, noise, accidents, and air emissions (Transport Canada 1997; Richardson 1999). These concepts provide a strong message to discourage motorized transport in favor of other more fuel-efficient modes like public transport and nonmotorized transport. A more comprehensive definition of sustainable transport considered behavioral and socioeconomic aspects in the definition by including concepts such as systems approach to transport development whereby economic, environment, and social systems and its interactive effects are considered in development (TRB 1997). Another definition factored in affordability, operational efficiency, increased competitiveness, and promoted balanced regional development, and introduced limits to emissions and waste upon the capacity of the planet to absorb them (ECMT 2004).

Sustainable mobility is a term introduced by the World Business Council on Sustainable Development (WBCSD 2004). It is defined as “the ability to meet the needs of society to move freely, gain access, communicate, trade, and establish relationships without sacrificing other essential human or ecological values, today or in the future.” While the focus of initial definition has been more on reducing automobile dependency, the sustainable mobility definition emphasized that certain level of car mobility is necessary to achieve economic growth, but it must be managed to promote generational equity.

2.3 Urban Transport Development in Asia

A definitive direction in urban transport development in Asia as a region is difficult to pinpoint as urban transport policies in each city emerged according to the contextual situation of local urban transport development, and factors affecting it like international urban policy trends, patterns of international assistance in the urban sector, and technological developments in transport infrastructure and service. The Asian megacities developed quite differently from the USA or European cities, as in many cities in Asia, urban transport policies are characterized by certain degree of flexibility that has tendency to adapt parsimony in the choice of technological improvement.

2.3.1 Precolonial Concept: The Path of Least Resistance

Before the waves of imperialism reached the pacific areas, transport systems in many parts of Asia were driven by basic instinct of survival. Early communities were laid out based on the contexts of people and their basic needs for shelter, food, and societal interactions. Settlements often catalyzed near the source of livelihood—in the sea and river coasts, or the fertile valleys. Trails and cleared paths that connect people to their place of work and to other settlements to trade often formed according to which is the fastest and safest way. Dry season pathways were often subjected to frequent monsoon rains and flooding and thus were very unpredictable. People make linkages based on their own intuition and perception of the environment based on their cultural orientation and beliefs. The result is dynamic and organic transport network structure driven by nature and people's innovations.

In Southeast Asia and Pacific Islands, early settlements were relatively small. Primary means for transport for both people and goods were walking, riding animal-drawn vehicles, and rowing indigenous boats in waterways. The level of development of transport mode varies significantly from settlement to settlements, according to geographical and sociocultural characteristics. Some early transport modes consist of rickshaws pulled by rickshaw drivers and carts and carriages drawn by animals like horses, cows, ox, and elephants. An interesting note is that while the advancement of the transport systems has provided faster and improved mobility in activity centers and eventually in cities in Asia, indigenous transport modes have remained in some rural areas in the Philippines, Thailand, and Indonesia to meet special mobility needs.

Movement of goods and people through waterway transport in the form of steamships or indigenous boats played an important role in both domestic and international trade. Sea trade terminals in Asia become the gateway to internal and external trade and the seat of concentrated economic activities. Megacities in Asia are mostly built upon historical center of trade and commerce.

2.3.2 Diffusion of Western Technology and Railway Development

Western imperialism in the Pacific region, which started in the sixteenth century, had influenced development of transport system in Asian cities in many ways. European powers that conquered major areas in the region include Britain, who established colonies in Indian subcontinent expanding up to the Persian Gulf, France, which occupy Indochina, and minor countries like Spain, which ruled in the Philippines, and Holland, which ruled Indonesia. Northeast Asian countries China, Japan and Korea, and Thailand were independent empire but were also greatly influenced by systems and technology in the western worlds.

Before motorized transport was introduced, walking is the primary mode of travel in Asian cities. The perception and appeal of walking took a different light in various cities and even in various classes in the society. In colonial cities such as the Manila, while walking from home to place of work was common among working class, walking under the hot tropical sun was considered undignified by the middle class and the elites who usually took or rented carriages to their daily destinations. In other cities like Shanghai and Tokyo, walking was a generally prevalent way of moving in the cities.

As the injection of western transport technologies came straight after the establishment of colonial settlements, it was readily assumed that the modernization pattern of urban transport in the west would be followed by the cities in Asia. The colonial rule established their major settlements in major cities, which were consequently the major ports of main trading routes in the region at that time. As among the initial objectives of colonial governments were to facilitate the movement of resources from regional production areas to the cities, the main thrust of infrastructure modernization in the late nineteenth to early twentieth century was the development of ports and harbors and interregional railways (Dick and Rimmer 2003). Interregional railway systems were developed in the region as a part linking resource-rich areas to the local and international markets.

Railways opened in Java in 1867, in Burma in 1877, and in Malaysia and Vietnam in 1885. Japan and Thailand, who were the only countries not under the European rule at that time, realized the need for railway for broader objectives that aimed for economic development (Rimmer 1986). In Japan, railways were introduced almost the same time as that of Java two years after the Meiji restoration and were driven by strategic linking of urban agglomeration areas (Dick and Rimmer 2003). In independent Thailand, railway development became an imminent investment to cope with the network building. France, who was at that time colonizing Vietnam, and Britain, who was colonizing Cambodia and Burma, developed railway networks in continental Asia (Kakizaki 2005). In the Philippines, interregional railways were completed only in 1892 and did not gain extensive network particularly after the colonial rule was taken over by the Americans who were focused on the development of road network.

2.3.3 Development of Urban Transport Systems

In independent countries Thailand and Japan, efforts to modernize the urban transport were centered on adopting the western technology of road-building. In the 1870s–1880s, the modernization approach of King Chulalongkorn of Thailand was to import and adapt foreign advance transport modes and road technology, like modern bicycles from Europe, rickshaws from Japan, and gharries and oxcarts from India. Bangkok was also the first city to introduce trams in 1893 (Dick and Rimmer 2003). During the Meiji era, Japan imported railway technologies from Europe. The

period also marked the initial efforts to modernize the road sector. However, it did not take precedence over the development of sea and rail transport.

The seats of the colonial rule were commonly established in port cities. They lay out the roads according to the system and technology that were accessible at that time in Europe with the exception thing—colonial rulers assert their rule over the natives through segregation. In the colonial cities like in Batavia in Jakarta and Intramuros in Manila, city cores were fortified by walls. Developments in colonial cities were often the scaled-down version of those in the west because of the limitations in funds for infrastructure. Independent states like Thailand, and the Japanese and Chinese empire, on the other hand, developed their urban settlements according to their own principles of road-building and some influence from the west.

The primary mode of transport in the cities in the late nineteenth century was predominantly slow form of transport like horse-drawn carriages, and ox-drawn rickshaws and carts, and river steamers. While the tramway systems were extensively introduced in European cities in the mid-nineteenth century, it reached the east in the late nineteenth to the early twentieth century. As the city functions diversify, so as its transport system. Tram systems, horse-drawn, steamer, or electric, were introduced in Jakarta in 1869, Manila in 1881, Bangkok in 1893, Seoul in 1899, and in Shanghai in 1908. Early tram systems were usually horse-drawn trams, and in tropical countries like Indonesia, among the problems faced by horse-drawn trams were incompatibility with local climate. Horses were documented to perish under the hot tropical sun. In Jakarta, Manila, and Bangkok, where the trams systems were extensive, trams served as the backbone of transport system supplemented by other indigenous transport. Japan, unlike other cities in the region, was able to establish more extensive tram systems in many cities. The first tram in Japan was the Kyoto Electric Railway in 1895. The tramways captured about four-fifths of the urban passenger in Kyoto at that time. Like what happened in the western cities, many of these tram systems in East Asian cities were destroyed or were to be technologically replaced by automobile and buses.

Early 20th century marked the first stage of modernization in Asian cities. The general direction of urban transport development is the diversification of modes with trams serving as a backbone. During this period, infrastructure construction rose as plans were laid down, and institutions to manage the cities were made. Decentralization made urban transport management more efficient. Independent urban municipality in Jakarta made local transport investment easier in 1905, while institutionalization of Tokyo Metropolitan in 1908 to manage public transport system. As the city functions became more complex, the need to define the boundaries and administration of these cities were the first to become apparent. In Taiwan, coverage of Taipei metropolis was proposed to be expanded. Initial city plans were also drafted at this time. Burnham's plans for the City of Manila were drafted in 1904. The plan was however marginally if not at all implemented. On the other hand, the packaging of transport policies in Japan in the early twentieth century has been influenced greatly by technological innovations and careful considerations of modern systems to fit the need of local circumstance. The stimuli

of the major turning points in urban transport policies at this time were surprisingly the aftermath of great disasters. The great Kanto earthquake and fire, for instance, has stimulated the expedition of the Special City Planning Act which proposed the expedition of the development of a subway network in 1924. While the years of the subway are yet to come in some decades, the opening of the Ginza line in 1927 by a private railway company marks the start of the present largest urban railway network.

2.3.4 Independence and Urban Transport Modernization

The late 1940s was the period of postwar reconstruction and the establishment of new urban institutions of the newly independent states. The independence of Korea, Taiwan, Philippines, and Indonesia mark the beginning of new regime in urban development. The move toward rebuilding basic transport networks became the first priorities in cities. Japan embarked on an ambitious plan to rebuild the urban road system and rails of Tokyo in 1946. In Manila, the USA engaged Philippine Planning Commission to lay out a plan for the basic road infrastructure in the city, which includes major thoroughfare plans consisting of ten radial and six circumferential roads. In Seoul, surface trams have maintained their competitiveness in the 1940s and in 1945 carry almost half of the Seoul population. While the trams still served as the backbone of urban transport, motorbuses and other land-based public transit modes were increasing to fill in service gaps in fast-expanding cities. In Manila, on the other hand, reconstruction of tramlines was abandoned in 1948 in support of motorbuses. This period of transition also gave birth to jeepney, assembled jeeps with capacity of 8–30 passengers.

The postwar rebuilding policies were critical in the consequent development of the urban transport system in cities in Asia in the 1950s. At this point, the relative equality in case of urban transport development can be asserted, but its development into to present state took a number of directions. However, even if each city has adhered to plans of rebuilding and development, only few have made concrete commitments for implementations. For example, among all the countries, only Japan had institutionalized mechanisms for financing massive infrastructure rebuilding plan after the war. Revenues from petrol tax were earmarked for construction of national and local roads identified in 5-year road improvement plan, which started in 1950s. Aside from this, the expressway systems envisaged in 1952 to link regional production areas were to be financed by loans from the postal savings bank and through a pooling system that provided incentives for network development. In Shanghai, road maintenance fees were charged locally to finance construction and maintenance of roads.

Land planning movements were likewise dominant in the 1950s. In the late 1950s, expansion of city populations necessitated the need for land expansion and special land management district. In Manila, Makati Development Authority was formed to manage a new CBD. In Bangkok, metropolitan planning was introduced

through the Great Bangkok Plan. Moreover, as countries embarked on economic development planning, the implementation of basic infrastructure became a priority for the capital cities. In Tokyo, three ring roads and nine radial roads were incorporated in the fifth 5-year road improvement plan. In Manila, the C3 road, popularly known as EDSA, was constructed. In Jakarta, massive revenue campaign for infrastructure expense entailed earmarking of “sin” taxes such as gambling tax and “steam bath” tax for infrastructure spending.

2.3.5 Dealing with Motorization

Asian cities faced rapid motorization as rapid economic growth increased household income and brought changes in people’s traveling preference. In the beginning, the trend was manifested by increased car ownership among the high-income groups. In the 1980s, while central metropolitan areas of Tokyo and Osaka recorded high private trip rate, the hinterlands surrounding Tokyo show high public trip rate (Nojiri 1992). In addition, significant investment for infrastructure capacity was noted in the 10th Construction Plan in 1971 of Japan, which covered infrastructure such as electrification of railway, international airport, harbor, etc. In Asia, aspirations to shift to private transport even by those who cannot afford automobiles showed through increasing motorcycle ownership. High degree of motorcycle ownership remained a common feature for many developing Asian countries, such as Indonesia, Thailand, and Vietnam.

The challenge of accommodating rapid motorization remains quite daunting for many developing cities. The primary response to motorization was to increase road investment. However, matching the speed of road-building with that of motorization is almost an impossible task. For example, in 1976, the road maintenance fee in Shanghai became insufficient to finance road maintenance. The opening of Shanghai in 1978, which elevates the role of the city to national significance, aggravated the need to upgrade infrastructure. In 1986, Shanghai Master Plan was done to respond to the urban problems of the 1980s and the 1990s witnessed great stride in road construction in Shanghai. By the end of the 1990s, Shanghai’s urban transport system consists of 940 bus and bus trolley lines.

In Seoul, bus service deregulation was one of the responses to improve public transport service and, at the same time, manage traffic. Restrictions on entry, operation, fares, and some conditions and procedures for licensing were implemented in the late 1980s until in 1993 (Yeong-Il 1995).

2.3.6 Developing Urban Railways

Railway remained major transport modes in most Asian cities; however, the system received different degree of priority in different countries. The popularity and seemingly technological superiority of road-based modes in the west since early

twentieth century had direct influence in most Asian countries, which prompted them to shift priority for road transport. Japan was the only exception where railway development received dominant priority before WWII and thereafter as well. In the wake of motorization, major Japanese cities such as Tokyo and Osaka phased out the streetcar system to provide more road space for motor vehicles. They, however, continued to expand the subway and surface rail networks in parallel. Some other megacities followed the suit, for example, Beijing opened the first subway line in 1965, Seoul in 1974, and Shanghai joined later in 1995.

Increasing city scale and demand for urban transport services became a burden that threatens the financing capacity of many of the public institutions in other Asian countries. The role of international financing institution increasingly became reinforced in the directions of the development of many cities in the region from 1970s. A particularly influential institution is the World Bank, which started giving out loans in the urban sector in 1972. Busway projects such as in San Paolo, Curitiba, and the Porto Alegre were highlighted in the 1980s following waning interest in urban rail projects because of the project appraisal methodology applied in the bank (Hensher 2007). This is because metro projects in the past did not really achieve its main aim of relieving the road of congestion. Although there are evidences of the benefits of urban rail projects in supporting higher-density development road-based systems cannot support, conservative project evaluations still seek satisfactory returns on railway as a hedge against the risks in long-term financing particularly from fragile governance structure and weak financial base and credit worth (Mitric 1997; Gwilliam 2000). Since the evaluation of urban rail projects usually involved long-range forecasting and the consideration of a plethora of externalities, worthiness of railway projects for funding in Asian cities is yet to be asserted.

2.4 Common Policy Measures and Relevance for Asia

Almost all concepts in urban transport evolved in western industrialized world, which were later disseminated to other part of the world including Asia. Table 2.1 lists policy measures that are commonly considered for addressing various urban transport problems. In addition, policymakers in developing countries have gained great deal of insights from the experiences of the industrialized world in formulating and implementing these policy measures and have attempted to address the urban transport problem in their cities. Some countries, in particular, the developed East Asian countries, successfully adapted some policy lessons and in the process made important policy innovations. However, developing Asia has been struggling to record similar success in dealing with emerging urban transport problems. The policy understandings and practical efforts in developing Asia seem to be overwhelmed by the direct borrowing of concepts evolved in western industrialized countries through formal education or professional (mainly bilateral or multilateral donors) channels. In fact, the experiences of and urban transport concepts evolved in

Table 2.1 Common policy measures for urban transport*Infrastructure investment and development*

- Road investment
- Railway investment
- Road-based public transport and paratransit
- Parking, transfer facilities
- Transit-oriented development and nonmotorized infrastructure

Improvement in vehicle and fuel technology

- Fuel-efficient vehicle
- Clean fuel, alternative fuel
- Safety standards

Regulations

- Land-use regulation (zoning, floor-area ratio)
- Garage and parking regulation, traffic calming
- Restriction on vehicle use
- Public transport regulation (entry, exit, and fare)
- Traffic control, lane allocation (e.g., bus lane, bicycle lane)
- Emission standards
- Safety standard and regulation

Economic and fiscal measures

- Property taxes, value capture, impact fees
- Road pricing, road toll, parking charges
- Fuel tax, vehicle taxes, bidding for car ownership
- Fare policies: subsidies, cross-subsidies, discount

Institutional and reform measures

- Deregulation and privatization
- Reform on ownership/operation of public transport
- Public-private partnership (PPP)
- Barrier-free transport

Information and awareness

- Intelligent transport system
- Environment, safety education
- Traffic information, safety guidance
- Public transport information
- Promotion of public and nonmotorized modes

western industrialized can offer important policy insights, at least in the broader terms, which can provide key strategic direction for sustainable urban transport in Asian megacities. Example of such policy insights may include the following:

- Increasing ownership and use of automobile along with low-density suburban housing (sprawl) may be a symbol of prosperity for an individual in the short run, the cost for the society, and eventually for the individual will be too high in the long run.
- However extensive the city road network be, peak-hour road congestion is unavoidable, implying that road-based transport system alone cannot meet the need of mobility and accessibility of modern society.

- A multimodal system, which comprises diverse modes, is essential to meet multiple objectives of sustainable transport system, which is economically efficient, environmentally sound, and socially safe and equitable.

Despite such and many other policy lessons from the industrialized countries, which may offer valuable insights especially in settling key strategic issues for sustainable urban transport policies in developing megacities, it may not be appropriate to apply the lessons or concepts directly as the context in developing world might be significantly different. The list of policy measures in Table 2.1 is in fact a proven list, but the question is how to pick up particular policy measure to suit the local condition. What is important first is to examine the relevance of a particular concept or lesson in terms of its potential to offer effective policy measures in the local context. This is truer in the case of Asian megacities, which exhibits range of special characteristics when compared with their counterparts in developed world. Next chapter will deal with this theme.

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