

DEVELOPMENT OF PUBLIC TRANSPORTATION
IN METRO MANILA

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1. INTRODUCTION

The development of public transportation of a city is unique. Notwithstanding the fact that invented transportation technologies had spread quickly and were made commonly available among the countries, their choice and application were different, thus, resulting in different system structures. Accumulation of these processes built the present urban transportation forms. Urban public transport of Southeast Asian metropolises such as Metro Manila, Bangkok, Jakarta, Singapore, and Kuala Lumpur sprung from different origins and underwent their own process of growth and decline. Even though their transport problems and issues seem similar, causes are usually deep-rooted in their respective history or locality, therefore, effective measures differ. The development of urban public transport is affected by a number of factors including technology, economy, policy, urban structure and socio-economic environment which are interactive with varied intensity during the course of history.

2. URBAN AND TRANSPORT SITUATION IN SOUTHEAST ASIAN CITIES

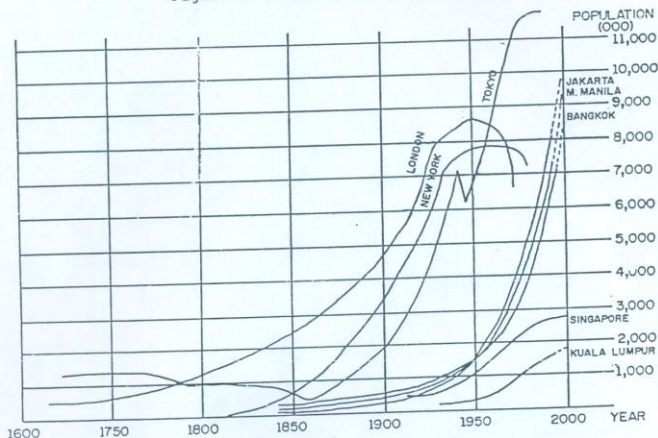
2.1 Growth of Metropolitan Areas

Urbanization, in terms of population concentration in urban areas, in developing countries progresses at a much faster rate than that in developed countries and is expected to continue over the years without a significant slowdown (Refer to Figure 1). Some of the characteristics of urbanization in developing countries are: it does not fully coincide with their industrialization; population and urban function concentrate in primate cities, thus widening the hierarchical gap between secondary cities; there is excessive population concentration beyond employment capacities which generates large informal activities; rapid urbanization precede necessary infrastructure development, and so on.

Selected major metropolises in Southeast Asian countries, which include Metro Manila, Bangkok, Jakarta, Kuala Lumpur and Singapore, had started to face sharp increases in their population only since the 1940s to 1950s. These cities with different origins - Manila was founded in 1571 under the Spanish, Bangkok in 1563, Jakarta in 1619 under the Dutch, and Kuala Lumpur in the 1820s and Singapore in 1819 under the British - had grown relatively slow until the end of 19th century. In the beginning of the 1900s, Manila, Bangkok, Jakarta and Singapore had populations of about 250 to 300 thousand which reached half a million between 1920 and 1930. However, the population increases thereafter had been very significant for Manila, Bangkok and Jakarta which exceeded 5 to 6 million in 1980 and are projected to continuously grow to exceed 10 million by early 2000. Singapore's population rose to 2.5 million in 1980 then slowed down due to its limited hinterland rural area. Kuala Lumpur, with a relatively small population size, is growing by expanding its urban area beyond the municipal boundary into the Klang Valley.

In the early stages of urbanization in these cities, the urban areas were compactly formed with average population density of about 250 to 300 persons per hectare which is similar to the western and Japanese cities during the same periods of urbanization; despite their significant differences in settlement pattern as well as social and cultural background. As transportation developed from walking to mechanized means, population density decreased quickly to about 150 persons per hectare. ^{1/} However, as the inner areas of Metro Manila, Jakarta and Bangkok are still densely populated, roughly between 300 to 500 persons per hectare, explosive proportions of expansion for the urban areas would still be expected even after their slowdown in population growth. ^{2/}

Figure 1 Growth of Selected Cities



^{1/} For example, average population density of Manila dropped from 200 in 1948 to 170 in 1966 and still further to 140 in 1984, while Bangkok was from 210 in 1936 to 150 in 1980, and Singapore from 220 in 1920 to 145 in 1980.

^{2/} The rapid expansion of urban areas was experienced by London between 1919 and 1939 when population increased by only 17% but urban areas grew about three-folds; by New York between 1920 and 1975 associated with motorization when population doubled but urban areas expanded almost ten times; and by Tokyo between 1950 and 1960 when population increased by only about 10% but urban areas more than doubled which was led by suburban railway development.

2.2 Urban Transport Situation and Characteristics

The current urban transport situation of Metro Manila, Bangkok, Jakarta, Kuala Lumpur and Singapore is summarized in Table 1. Bangkok, Metro Manila and Jakarta are similar in size of population and urban area but fairly different in features of urban transportation, while

Singapore and Kuala Lumpur are also quite different in urban transport profile, as briefly explained below:

Motorization progresses hand-in-hand with the growth of the metropolises and would accelerate further as the economy improves. Car ownership ranges from the highest in Kuala Lumpur of 280 per 1000 population to the lowest of 62 in Metro Manila with all metropolises registering fast growth except Singapore where ownership and use of cars are constrained through high taxation and congestion pricing.

The three metropolises, Bangkok, Metro Manila and Jakarta, already suffer serious traffic congestions well before car ownership reaches its expected level. Metro Manila, Bangkok, Jakarta and Kuala Lumpur have no effective restraint measures on car ownership and use although Kuala Lumpur at one point tried the area licensing scheme and Metro Manila tried the alternate use of cars with odd-even plate numbers. Pricing schemes were always one of the recommended restraint measures in recent transport studies but hardly considered socially acceptable or technically feasible by decision makers.

Modal split differs significantly by metropolis, though dependence on private transport is generally seen, with the highest share for private transport in Kuala Lumpur (66%) followed by Bangkok (60%), Jakarta (60%), Singapore (46%), and Metro Manila (30%). The metropolises other than Metro Manila contain significant motorcycle traffic of roughly 20% of the total motorised transport demand. The substantial and increasing motorcycle travel demand implies that the need of a personal travel mode of non-car owning households is strong. Also, road users intend to avoid delay in travel time due to traffic congestions and are protecting themselves against poor public transport services. Similarly, it is also to be noted that a considerable portion of the private transport is shared by the school bus and company bus.

Share of walk trips varies significantly by metropolis, with the highest in Jakarta (47% of the total demand) and the lowest in Bangkok (15%). Although there is no available detailed analysis on the walk trips, it is considered that urban settlement pattern, income level and distribution, traditions and customs would affect the walk trips. The use of bicycle for private transport has never become popular in the above mentioned cities although it plays a vital role in many cities of China and Vietnam.

Availability and composition of public transport are also quite different from one metropolis to another. Bangkok is served mainly by stage buses and private minibuses which are supplemented by hired motorcycle, taxi, water transport and rail commuter services. Metro Manila's public transport demand is mainly met by a hierarchy of public transport modes including LRT, bus, jeepneys, and tricycles. Jakarta is provided with buses and various types of paratransit where rail commuter service is expected to play a greater role in the future.

The spectrum of public transport modes for Kuala Lumpur and Singapore is quite simple; the former has buses and minibuses while the latter Metro and buses.

Rail-based Mass Transit: Only Singapore and Metro Manila have urban rail transit. Singapore constructed a 67-km MRT in 1989 with underground section in city centre and elevated section in suburban

Table 1
Profile of Urban Transportation in
Selected Southeast Asian Cities

Item	Bangkok	M. Manila	Jakarta	Kuala Lumpur	Singapore
Area : sqm					
1) Administrative	1,569	636	650	242	620
2) Actual Urbanized 1/	450	500	500	150	300
Population					
1) 1985 (1975) : 000	6.1 (4.1)	7.0 (5.0)	7.9 (6.5)	1.3 (1.0)	2.6 (2.0)
2) 1975-85 Growth: %/yr	4.1	3.4	3.7	2.8	2.4
3) Primacy (1980): %	69	30	23	27	100
Population Density: persons/ha	140	140	160	90	90
Economy					
1) Nation's Per-Capita GDP:US\$	850 ('85)	590 ('85)	450 ('85)	1,810 ('85)	7,910 ('85)
2) Capital's Ave. House : L.C. hold Income/Month :US\$ 2/	B10,800 ('89) 430	P6,600 ('87) 315	Rp33,354 ('84) 310	M\$1,380 ('85) 550	S\$2,000 ('85) 1,000
Vehicle Ownership					
1) No. of 4-wheel Veh: 000	1,040 ('88)	436 ('86)	509 ('85)	361 ('85)	347 ('86)
2) No. of Pass Cars/Vans: 000	972	362	314	285	222
3) No. of Motorcycles: 000	821	43	696	265	119
4) G. Rate of 4-wheel : %/yr	10-12	3-5	8-10	7-8	2-3
5) No. of 4-wheel/000 pop.	170	62	65	280	135
Transport Demand					
1) Total No. of Motorized Trip/day : mil.	11.9 ('85)	12.6 ('85)	7.0 ('85)	2.4 ('85)	4.0 ('85)
2) Trip Rate (Motorized)	1.95 ('89)	1.79 ('80)	0.89 ('85)	1.83 ('85)	1.52 ('80)
3) Modal Split (Private vs Public) 1/	61:39	25:75	51:49	68:34	48:54
4) % of Motorcycle to Total Motorized	18	neg.	20	19	n.k.
5) % of walk to Total Trips	15	34	47	28	n.k.
Public Transport					
1) Total Demand (000/day)	8,090 ('88)	n.k.	n.k.	n.k.	n.k.
2) Modal Share (000/day) %/					
- Rail	20 ('88)	15 ('90)	21	neg.	neg. ('88)10/
- MRT/LRT	-	350 ('90)	-	-	365 ('88)10/
- Bus	6,090 ('88)5/	2,130 ('83)	1,776	1,130 2/	2,620 ('87)
- Paratransit	930 ('88)5/	7,420 ('83)5/	1,752 5/	466 9/	26 ('87)10/
- Taxi	730 ('88)5/	430	401 5/	110-	n.k.
- Water	260 ('88)	neg.	-	-	-
- Non-motorized	-	n.k.	609 5/	n.k.	n.k.

- Sources: a) World Development Report: Economic and Social Data Series, 1989 WB
 b) The Study on Medium to Long-term Improvement/Management Plan of Road & Road Transport in Bangkok, 1990 JICA
 c) Singapore Urban Transport Improvement Study, 1988 JICA
 d) Metro Manila Transport Planning Study, 1984 JICA
 e) Feasibility Study on Transportation Facilities Projects in Klang Valley, 1989 JICA.
 f) Arterial Road System Development Study in Jakarta Metropolitan Area, 1987 JICA.
 g) Other publications

Estimated based on area by landuse.

Converted based on following exchange rates at the time of the data in Local Currency;
 US\$1.0 = B\$5.9 = P21.0 = Rp1050 = M\$2.5 = S\$2.0

Household Expenditure.

Calculated by multiplying 1985 population by trip rate (motorized).

Motorcycle and taxi trips are included in Private.

Bus includes minibus, paratransit comprises solor-leck, taxi; includes solor and hired motorcycle.

Taxi includes: 430 thousand of tricycle. Data on ordinary taxi is not known.

Paratransit includes minibus and microbus. Taxi includes 339 thousand of Beja/Helicak, and.

68 thousand of ordinary taxi. Non-motorized is becak.

Bus includes minibus and stage bus. Paratransit includes factory/school bus. Figures are for Klang Valley which includes Kuala Lumpur. Population of Klang Valley is 2.5 million.

/ It is estimated that about 900 thousand passengers will be carried when it is in full operation.

Paratransit includes factory/school bus.

areas and has intentions of further expansion. Metro Manila opened a 15-km elevated LRT Line 1 in 1985 along the most heavily trafficked corridor. Both systems are well utilized though the former meets about 40% of the total public transport demand while the latter still roughly 4% only. Urban rail transit projects and proposals of the other metropolises are also being implemented or promoted earnestly; both by improving the existing railways for commuter services and by constructing new systems. 3/ (Refer to Table 2) Due to heavy financial requirements, Governments not only introduce foreign soft loan but also aim to tap private sectors commitment through the BOT (Build, Operate and Transfer) scheme.

Bus is still and will continue to be the main mode of urban transport. However, in spite of its importance, the operation and management of the bus transport sector have not been effectively handled by the Governments especially in Metro Manila, Bangkok, and Jakarta. Integration and modernization of bus transport lead by governments failed in many cities except in Singapore. Publicly owned bus corporations incur chronic financial losses, requiring heavy subsidies and yet are unable to meet the demand properly. The financial failure of the bus transport makes it more difficult for the Government to expand the bus services to match the increasing demand. Moreover, various support measures and industry policy for private bus operations are insufficient, inconsistent and not well defined. While governments are not determined to introduce effective policies, the bus transport market, which is willing to pay higher fare for better services, has steadily grown.

Varied types of paratransit modes exist widely in Metro Manila, Bangkok, and Jakarta due to the difficulties in operating the buses under prevailing circumstances (refer to Table 3). These modes can be more adequately termed as intermediate public transport (IPT) modes considering their technological, services, and management features. They fill the varied demand-supply gaps of urban transport which can not be effectively met by the conventional bus and taxi or even by the private transport. Inasmuch as these IPT modes look different from each other, common characteristics exist as follows: locally manufactured based on imported key components such as engines, chassis, etc.; small to medium sized vehicles, requiring only intermediate technologies; small scale and flexible operation and services; easy entry; non-corporate and private ownership; individual to group management; and so on. The IPT business is one of the attractive investment opportunities requiring relatively small capital that can assure daily cash income. Due to the high dependence on locally available resources than say the buses, the IPT generates extensive formal and informal activities and services. Government regulations and enforcement on these organizations, vehicles and operations are often attacked by illegal entry and operation, which, however, ironically have these modes respond to the ever changing demand rather quickly and effectively.

3/ Metro Manila is undertaking rehabilitation/improvement of existing national railway for commuter services and is about to implement LRT Line 2 and Line 3. Bangkok is promoting elevation of existing state railway and construction of LRT systems. Jakarta is placing more emphasis on the improvement of existing heavy railways for urban transport use which is currently under construction. Kuala Lumpur intends to improve existing heavy railways and construction of LRT.

Urban Area		System Outline	Status
Metro Manila	E.S.	(1) Commuter service of PHR Main Line South (2) Commuter service of PHR Main Line North	Current traffic of 30,000 pass/day. Rehabilitation program on-going. Negligible patronage. Rehabilitation planned.
	N.S.	(1) LRT Line No. 1 (elevated 15 km). (2) Capacity expansion of Line No. 1 and construction of Line No. 2 (elevated 10 km). (3) Construction of mass transit along EDSA	In operation since 1985. Current traffic of 300,000 pass/day. Expansion of train capacity planned. To be constructed on BOT. Soft loan being sought. To be implemented on BOT. Under negotiation.
Bangkok	E.S.	(1) Elevation of existing track, (60 km) construction of expressway (57 km), and commercial development of the ROW of SRT (State Railway of Thailand)	Contract awarded to private investor group (Hopewell) on BOT.
	N.S.	(1) Construction of elevated MRT (BMS 25 km) under BMA (2) Construction of elevated MRT under MRTA	Contract awarded to private investor group on BOT. Detailed study is underway.
Jakarta	E.S.	(1) Rehabilitation/improvement of existing Jobotabek railway system. (2) Construction of new lines from Airport.	Partly completed. Under construction.
	N.S.	(1) Various conceptual plans.	No concrete actions
Kuala Lumpur	E.S.	(1) Construction of MRT of 5 lines with total 137 km length by maximum utilization of the existing KTM (Malayan Railway) reserves and facilities.	Planned.
	N.S.	(1) Construction of LRT Line No. 1 (10.5km; 8 km viaduct, 10.5 km at grade). Final total length 52.5 km (5 lines). (2) Construction of Monorail System in CBD, (7.7 km).	Planned.
Singapore	E.S.	(1) Operation of Railbus between Singapore and Johore Bahru, along KTM.	In operation.
	N.S.	(1) Construction of 67 km of elevated/underground MRT. (2) Construction of new MRT lines. (3) Construction of AGT systems in various locations.	In operation. Current traffic 700,000 pass/day. Planned. Planned. AGT in Changi Airport is in operation.

Note: E.S. denotes existing system; while N.S. new system.

Table 3
Existing Intermediate Public Transport (IFT)
Modes in Southeast Asian Metropolises

Passenger Capacity	Base Vehicle Type	Metropolitan Areas				
		Bangkok	Metro Manila	Jakarta	Kuala Lumpur	Singapore
1-6	Pony Cart Bicycle Motorcycle Others	- Samlor Soi Bike Tuktuk	Calesa Pedicab Tricycle -	Becak - -	- Trishaw -	- Trishaw -
6-10	Light Truck	Silor	-	Oplet Microlet	-	-
11-20	Light Truck	Son Teo Minibus	Jeopnoy	Bis Mikro	Minibus	Scheme A Scheme B (minibus)

3. HISTORICAL DEVELOPMENT OF PUBLIC TRANSPORT IN METRO MANILA

Metro Manila had developed with strong Spanish and American influence since its basic urban structure was built during these periods. The urbanization process of Metro Manila could be classified into four periods in accordance with changes in policies and differences in urbanization pressure.

On urban transportation, a variety of public transport modes appeared, grew and declined in the history of Metro Manila. The four periods of Metro Manila, divided according to urbanization process, coincides with those of urban transportation development wherein representative modes played major roles, both for the urban form and transportation (Refer to Figure 2).

3.1 Beginning and Middle of the Spanish Period (1570 - 1830) or Period of Walk and Water Transport

The urban core was built by the Spanish as a base for integrating territory and trade. Population grew from about only 2,000 in 1570 to about 40,000 in 1620 and to about 150,000 in 1830. The urban area soon expanded beyond the Intramuros (walled city) and spread along Pasig River to the adjoining areas but covering only about 3 sq.km. Town planning was practised from the beginning according to the Royal Decree on Town Structure.^{4/} Urban transport system was provided by roads and a total of 40 kms. estero (canal) which covered urban and suburban areas.

Major water transport modes were the "casco" and "banca". The former, influenced by the Chinese Sampan, plied the Pasig River and its tributaries carrying cargo and passenger. It was not only used as a transport mode but as a dwelling place as well by a considerable number of people. On the other hand, the banca was a simple dug-out canoe of planking and oars. This narrow and shallow vessel, which when covered with leaves, could only provide sitting room for cramped-up passengers. The banca evolved to a vessel of plywood boards and motors and became popular as fishing boats shortly after World War II.

On land, the carabao (an aboriginal water buffalo) was used mainly for goods transportation in different forms such as the carabao-drawn cart/sledge, carabao back, pack-carabao. The carts used in this early period had only solid wheels without spokes, hewn from trunk of trees, which made considerable noise while in motion. For passengers, the "hamaca" or "duyan" (hammock) and "urimol" (sedan chair) were available for hire. Although the horses were imported from China and New Spain (Mexico) in 1587 and locally bred, the horse carriages were only for the well-to-do.

During the early part of the 1800s, urban transport situation for other metropolises was similar; Singapore had the bullock cart or ox cart, horse carriages, sedan chair, "redi" (hammock), etc.; Jakarta had canals and various water transport, carriages, carts, water buffalo cart, sedan chair, "palanquin", etc.; Bangkok had extensive river/canals and water transport as well as similar animal drawn carts.

Figure 2
Public Transport Modes in Metro Manila

Mode	1500	1600	1700	1800					1900						
				20	40	60	80	90	10	20	30	40	50	60	70
WATER TRANSPORT	Casco	-----													
	Banca	-----													
ANIMAL-DRAWN	Carabao Back	-----													
	Carabao-Sled/Cart	-----													
MANPOWER	Urinal	-----													
	Hamaca/Duyan	-----													
	Pedicab	-----													
HORSE-DRAWN	Calesa/Carronata	-----													
	Carretela	-----													
	Carretela-Bus	-----													
	Carruaje	-----													
RAIL	Horse Tramway	-----													
	Steam Tramway	-----													
	Electric Tramway	-----													
	Suburban Railway	-----													
	Elevated LRT	-----													
MOTORIZED	Trolley Bus	-----													
	Bus	-----													
	Auto Calesa	-----													
	Jeepney	-----													
	Tricycle	-----													
	Taxi	-----													
First Commercial Use of Major Public Transport Modes	1826/27 ● 69 ▲ Danibus 1832/53 ○ ● 83 ▲ Horse Tramway 1881/84/96 ● ▲ Electric Tramway 1828/1843 ● 63 ▲ Suburban Railway 1883/93/99 ● ○ ▲ Electric Suburban Railway 1890/1904/27 ● ○ ▲ Tube Subway 1905/19 ○ ▲ Motorbus(urban)														

LEGEND

Casco : Flat-bottomed watercraft, ornamented with various designs of flowers, leaves and branches.

Banca : A boat dug out from a tree trunk with outriggers and sometimes with a roof.

Hamaca/Duyan : Hammock hung on a long pole supported on the shoulders of two or more men.

Urinal : Chair made of rattan, with or without canopy, suspended from bamboo poles borne by two men.

Calesa : Originally 4-wheeled, with wide upholstered seats and folding top driven by a licensed uniformed cochero (coachman), later transformed to the existing 2-wheeled canopied type.

Carronata : 2-wheeled, drawn by one horse, canopied and with rubber tires, but commonly with cheaper/dilapidated bodies and unpadded bejoco seats; economical version of the present calesa.

Carruaje : 4-wheeled, drawn by 2 to 6 horses, with 4 to 6 seating capacity; the most luxurious type and widely used by the upper class.

Carretela : Rural version of the calesa built to carry twice the number of passengers with space at the back for various goods, often used by businessmen in Manila.

Carretela-Bus : Open-sided, has 4 rows of seats with a capacity of 16, drawn by 2 horses, operated on fixed route.

Auto-Calesa : U.S. military jeeps converted to shared taxi with 6 passenger capacity.

Jeepney : U.S. military jeeps converted to fixed route public transport vehicles; the body design then underwent a number of alterations and improvements; i.e., painted with carnival colors, iron bars were attached to the ceiling, and seating capacity was increased (15-21). Tricycle : A cab attached to a motorcycle; mini taxi for feeder service.

Pedicab : A cab attached to a bicycle.

3.2 **Latter Years of the Spanish Period (1830 - 1898) or Period of Horse Carriages**

- a) **Initial Urbanization:** Urbanization, during this 70-year period, took place geared by the changes in policies and active economic activities.^{4/} The colonial government started to actively construct roads in order to promote the development of internal areas that had been long neglected. The urban areas spread along these arterial roads and the use of coaches/carriages was accelerated. The introduction of the horse tramcar in 1885, the first mass transit in the country, also accelerated the expansion of the urban areas and created a new life style of residing in the suburbs and working in the city centre. Population of Manila alone increased to about 200,000 and a number of communities in the suburban areas were integrated with Manila. The concentration of urban activities started to disperse, leaving Intramuros as the administrative centre and making the Binondo area as the commercial and industrial centre. During this period, various urban services commenced such as the mail service in 1833, Spanish daily newspaper in 1846, water supply in 1882, telephone service in 1890, electricity supply in 1895 and so on. A railroad between Manila and Dagupan (195 km) was opened in 1892 and the construction of a modern Manila port started in the same year. The urban area, however, was still limited to only about 10 sq.km. at the end of this period.
- b) **Spread of Horse Carriages for Urban Public Transportation:** Horse-drawn vehicles became popular and available for the public only after the 1830s when roads were improved and economic activities were on an uptrend. As similarly experienced by European cities, coaches started to be used widely only in the latter half of the 17th century when technological improvements on coaches and pavements were made.

The various types of horse carriages were imported and patterned after the European models. They were soon locally designed, manufactured, and widely used for both private and public transport. The most popular one was the "calesa" or "carromata" which originated from the European "caleche" but evolved into a kind of town sedan perched on two large iron wheels with wooden spokes, a light small body with a form of springs and a capacity of not more than two or three passengers. To the basic European design, brass lamps, silver ornaments on wheels and body, plumes and tassels were added. When the "calesa" became an indigenous vehicle, it spread quickly and experienced a long golden age from the middle of the 1800s throughout the middle of the 1900s. It was only until the emergence of the automobile that the "calesa" was compelled to move to the side streets and later met stiff competition with the "jeepneys".

^{4/} In 1834, Manila was opened totally to foreign trade.

Other metropolises also had various horse and carriages, firstly for the well-to-do then later for hire when smaller carriages were made. 5/

- c) **Export of Japanese Transport Technology - Jinrikisha:** During the same period in Tokyo, however, horse carriages never became popular in spite of the large population of about one million. This was due to the strict control imposed by the government on the usage of vehicles by the public and the narrow unpaved roads which was made so for military reasons. It was only in 1863 and 1870 when the use of the cart and the "jinrikisha" were permitted. 6/ Vehicular traffic spread very quickly that at about 1880 the "jinrikisha" and the cart numbered some 25,000 and 30,000, respectively. A significant impact of the Japanese transport technology, at this time, was the export and spread of "jinrikisha" in the Asian cities; especially the English colonies. Singapore introduced the "jinrikisha" in 1880 via Shanghai and had about 4,000 units in 1892; increased to about 10,000 towards the beginning of the 1900s then gradually decreased to about 3,500 - 4,000 in the late 1930s and finally faded out when the "trishaw" was introduced in 1947. Bangkok imported the "jinrikisha" in 1871 and other metropolises did the same as well. However, the "jinrikisha" did not become popular in Jakarta and no record is found in Manila on this mode. One of the reasons could be attributed to the fact that Manila had relatively wide spread and use of the localized horse carriages.
- d) **Introduction of First Mass Transit System:** Initiated by an officer of the colonial Government, who was impressed by the horse tramways in many European areas, the first mass transit system was planned for Metro Manila in 1878. The franchise was granted to a private company called Compana de Tranvias de Filipinas. This transit system (called the Tranvia) first started operation of its first section between Binondo and Tondo in 1884 followed by four other lines as well as an extension of Tondo line up to Malabon by steam railway. A total route of 20 kms. covered major thoroughfares of Manila that then had a population of about 200,000. The system was comprised of single cars with 18-20 passenger capacity driven by a horse which operated at an average speed of 8 km/hr for every 5 to 10 minutes interval. It was well utilized and daily ridership was estimated to be roughly 20,000 a day.

Another metropolis which introduced horse tramways was Jakarta in 1869 when Tokyo only had its first omnibus. Tokyo had to wait until 1883 before a 16-km horse tramway was built which was later extended to about 34 kms. by 1902. 7/ The omnibus pose no threat

5/ "Hackneys" or "gharries" in Singapore; "dokar", "sado", "dolman", "mylord", "bendi", "andong" in Jakarta; etc.

6/ "Jinrikisha" is a two-wheeled transport mode pulled by a man.

7/ The omnibus spread in major cities of Europe and the U.S. during the 1830s. The horse tramway, which was first constructed in New York in 1832, spread quickly in the U.S. cities but only became popular in European cities after the 1860s due to relatively strict institutional and regulatory constraints of the latter cities.

to the "jinrikisha", which was the main urban passenger transport mode during that time, but the horse tramway did. Although a political group comprising of "jinrikisha" pullers was organized to oppose the construction and operation of the horse tramways, these two modes were basically complementary rather than competitive in a large city with sufficient demand.

Considering the growth of the "calesa" and the availability of the horse tramways, Metro Manila had a relatively high service level of public transport at that point in time (late 1880s and early 1900s). However, the tramways soon declined since it was plagued with problems such as the epidemic which attacked the horses, the difficulties in acquiring horses due to the Spanish-American war, and the mismanagement of the company. The system's operation deteriorated throughout the 1890s. In 1900, the Intramuros line was abandoned and finally the assets of the company were sold to an American company known as MERALCO (Manila Electric Railway and Light Company) in 1903.

3.3 American Period (1898 - 1945) or Period of Electric Tramway (1905 - 1945)

- a) **Urbanization Lead by Rail-based Mass Transit:** The electric tramway, which was first put to practical use in 1888 and spread quickly in the U.S. cities, ^{8/} where throughout the subsequent two decades, electric tramway led urbanization and contributed to the formation of public transport-based urban areas with relatively compact and high population density. ^{9/} This time, Japan did not delay much in introducing the electric tramway. The first one was constructed in Kyoto in 1896, and in Tokyo in 1905. Other Southeast Asian metropolises constructed electric tramways at around this time; Bangkok as early as 1894, Jakarta in 1897 (steam tram was constructed in 1881), Singapore in 19205 (steam tram in 1885).

MERALCO, which was given a 50-year franchise, opened about 65 kms. of electric tramway system only after a year and a half of construction period. The system covered the urban and suburban areas of Manila with a population of about 250,000. It was further expanded to about 85 kms in 1925 with 173 cars. The ridership increased from 10.5 million in 1906 to 37.8 million in 1920. ^{10/} The success of the electric tramway was attributed to the following:

- Physical and institutional infrastructures developed for the riding public of the horse tramway existed and benefited the electric tramway development.

^{10/} A total of 1,900 kms electric tramway was in operation in 1900 in the U.S. cities.

^{11/} On the other hand, the electric tramway was not earnestly developed in Europe (only a total of 96 kms in 1890) primarily due to aesthetic reasons of overhead wires.

^{12/} This means that daily ridership is about 35,000 and 126,000 passengers for the population of about 200,000 and 300,000, respectively.

- Progress of urbanization and industrialization under the

American democracy created strong urban transport demand.

- Extension of the system coincided with suburbanization which made the additional investment very effective.
- The "calesa", which was the main mode and used extensively, easily became a complementary mode rather than a competition. There were no significant number of automobiles then.

The urban rail transit business, which developed hand-in-hand with urban growth, not only generated double the fare revenue as against the operating expenses in 1913 but also contributed significantly to the electricity business of the company. The latter business was relatively small but it started to exceed the revenue of the tramway in 1914 and prospered further.

- b) **Emergence of Motor Vehicles:** The introduction of motor vehicles in the Philippines occurred relatively early (i.e., started in the 1910s).^{11/} Backed up with the accelerated development of roads and the sales war of many dealers,^{12/} the number of motor vehicles increased considerably from 14,000 in 1920 to 43,000 in 1934 with roughly 60% found in Manila. During the 1920s, motor vehicles became popular and various motor-vehicle-based public transport modes were born in the 1930s such as the taxi, autocab, garage car, PU car and the "auto calesa"^{13/}. The first organized bus company started operation in 1920 between the city and suburban areas. Among these modes, the taxi and "auto calesa", which were particularly superior in speed and conveniences, soon became popular and started to threaten the operation of the "carromata" and the "carretela" that were still the most popular transport modes then. ^{14/}

Motorcars made their first appearance in Singapore in 1896 but became popular after the 1920s, the large bus and "mosquito" bus services in 1920, the trolley bus which replaced the electric tramway in 1926. In Jakarta, motorcars appeared at around 1900 and buses (including the "mosquito" buses) became popular by the 1920s. Tokyo had its first bus in 1918 but the extension of automobiles was discouraged by the Government. With the entry of various motor vehicle-based public transport modes, urban areas of the metropolises started to have serious mixed traffic of electric tramway, horse carriages, bicycles and various types of motorcars.

^{11/} In 1912, Manila had 1,026 motor vehicles including 628 cars, 259 motorcycles, and 111 trucks.

^{12/} It was reported that cars alone had a total of 174 different makes sold by 24 makers and dealers.

^{13/} Garage car replaced the "stables" and can be hired by phone. PU car or public utility car are mini taxis without taximeter but with specified route.

^{14/} There were 5,368 rigs in 1933.

- c) **Disappearance of Tramways:** Under these circumstances, the new construction and maintenance of the electric tramways became expensive and more difficult. MERALCO introduced the trolleybuses in Intramuros in 1924 and 20 locally designed and manufactured buses in 1927.^{15/} MERALCO buses expanded operation with 124 buses and the ridership equaled that of the Tranvia. Meanwhile, ridership of the Tranvia started to decline despite the urban growth experienced at that time. From a peak record of 40 million in 1920, ridership slumped to 35 million in 1925 and still further to 28 million in 1941. The system was heavily damaged by the flood of 1943 and was mostly destroyed during the World War II. It was later abandoned in 1945.

Electric tramways of other metropolises were also abandoned mainly due to the conflict with road traffic; 1926 in Singapore and Jakarta, and 1968 in Bangkok. Tokyo started to close its 215 kms electric tramways in 1959 and mostly abandoned it by 1971 with only a remaining 12.2 kms of the route existing in 1979. New York, Chicago, London, Paris, etc. had also removed the electric tramways by the 1950s, which once contributed to the urban formation and inculcated public transport riding habits in citizens, due to the following reasons:

- Increased road congestions and worsened operating conditions for which the Government did not take any effective counter-measure.
- While rapid rail transit was constructed and motorization made progress, the electric tramways were considered out-of-date and advantages of motorcars were emphasized by the automobile industry.
- Modernization of the electric tramways was not promoted by the Government.
- Electric tramway companies themselves concurrently started bus operations.

While on the other hand, a number of European countries such as Germany, Holland, Switzerland, Austria, Belgium, Eastern European countries retained the electric tramway systems and even expanded them. The reasons for this are:

- Electric tramways were normally owned by City Authorities and their organizational and financial status were relatively stable.
- Motorization in Eastern European countries was moderate.

^{15/} Except for the engines and chassis which were imported.

- Technological improvements of tramcars in Europe made progress since the 1930s and together with the exclusive right-of-way, priority measures, organizational improvement, development of the competitive LRT closer to the performance of rapid transit system was successful.

- d) **Spread of Bus Transport:** During the latter part of the Tranvia period, motorization made progress with organized bus operators making entry one after another to meet the increasing transport demand of the city which grew from a population of 460,000 in 1918 to 993,000 in 1948. However, it was at the last part of this period, which was the war period between 1942 and 1945, that almost all the motor vehicles were procured by the military and public transport enterprises were destroyed. It was at this time when the Administration's capabilities decreased that numerous small operators, using all available vehicles, started to flood the city to meet the demand of the one million population. Organization of the public transport, which developed during the American period, receded significantly.

3.4 Independent Country Period (1946 onwards) or Period of Automobiles

- a) **Rapid Urban Growth:** Manila grew continuously and started to form the metropolitan area. The population of Metro Manila became 2.5 million in 1960, 4 million in 1970, 5.9 million in 1980, and 7.9 million in 1990. The urban area expanded to about 500 sq.km. in 1980.
- b) **Failure in Organized Bus Transport:** During the urban explosion period, there were practically no organized mass transit in the metropolis. MERALCO and Halili transit resumed bus operations by importing 150 and 200 buses in 1946, respectively. The Government also established the Metropolitan Transportation (METRAN) in the same year to operate 100 buses. However, MERALCO backed out from the bus business in 1948 and so did METRAN after only 14 months of operation. This decline was largely attributed to the fact that the Government lost administrative and regulatory control over the numerous transport operators who were mostly born during the war time and were fiercely competing each other. Bus operators were disorganized and consisted of more than 100 operators, most of which owned a few units only.

In order to improve bus operations in the metropolis, the Government created the government-owned Metro Manila Transit Corporation (MMTC) in 1974 with 60 imported buses which was increased to 700 units including airconditioned and double decker buses. Corollarily, 119 bus operators were amalgamated into a 12-member consortia in 1980. Under the Bus Subsidy Assistance Program, the consortia received 1,000 buses on lease-purchase basis at privileged financial term. Moreover, in order to ensure the efficient operation of the buses, the Government enforced service maintenance contract and implemented the ban of "jeepneys" from a number of major thoroughfares. However, they registered losses in 1983 and continued to incur staggering losses since

then. Many were forced to return their units starting mid-1984. Reasons for the unsuccessful bus operation of Government-owned corporations are specifically stated in many papers while the failure of the bus consortia in Metro Manila is attributed to the following:

- Inadequate fare structure to cover the increasing costs.
- Stiff competition with "jeepneys", illegal buses and the Government-owned MMTC buses.
- Inconsistent policy of the Government in planning, implementation and enforcement.
- Uneconomical costs siphoned off by enforced strict maintenance program under which two service contractors were accredited by the Government but the operators could not cope with the high maintenance costs.

Thus, the intention of organizing the bus transport for Metro Manila failed. Singapore succeeded in organizing their bus transport by amalgamating small bus operators in 1935, in 1970 and in 1973, which brought about the almost complete incorporation of bus services. Kuala Lumpur underwent amalgamation of "mosquito" operators into 8 non-corporate stage bus enterprises in 1937 and controlled minibus operations in 1975. Bangkok amalgamated 22 private and 2 state-owned bus operators into one entity under the Government-owned PPD (Perusahaan Pengangkutan Djakarta), which took over the bus and electric tramway operations in 1954; amalgamated small midibus operators into a single corporation in 1976 and so on.

- c) **Development of the Jeepney:** Taken from the surplus army jeeps of World War II as a passenger and freight vehicle, the "jeepney" evolved as a major public transport mode in the country. It shared 73% of the total public transport demand or carried 7 million passengers while the buses carried only 2 million in 1980. The "jeepney", coined from the words jeep and "jitnēy", dominated the postwar public transport of the metropolis. The success of "jeepneys" in Metro Manila is attributed to the following:

- Technology was available locally except for the second hand engines and chassis which were imported.
- Financial viability was ensured in different manners such as the flexibility in operation (route deviation, trip cutting, etc.), overcharging of fare along unprofitable routes, and so on.
- A large number of routes directly link origins and destinations to provide almost door-to-door services that were made possible due to the well configured road network of Metro Manila and the intermediate size capacities of the "jeepneys".

- The riding habit and environment developed by the "calesa" and "auto calesa" instantly matched the "jeepneys".
- Although the entry and operation of "jeepneys" were regulated by the Government, enforcement was not so strict that they were able to respond to the demands of the market effectively.
- Accumulation of "jeepneys" created a strong political bargaining power for Government transport policy as well competitive strength against other modes, especially the buses.

Rapid growth of "jeepneys" competed with buses. Between 1970 and 1986, 11 large to medium sized companies with a total fleet of 1,887 buses and other minor companies with a total fleet of 200 buses went out of business due to financial difficulties caused by the cut throat competition offered by the ubiquitous "jeepneys". The "jeepneys" were not in favor with some of the Government's control measures; the rerouting of "jeepneys" from major roads to secondary roads was tried from time to time but met no success since the drivers and operators use their acquired strong political bargaining power to resist the plans.

- d) **Role of the Tricycle:** Tricycle is another IPT which spread quickly since the late 1970s. It was not captured in the 1970 person trip survey but in the 1980 person trip survey. The results of the survey showed that tricycles shared 5% of the public transport demand with approximately 17,000 units. Unlike the "jeepneys", tricycles are banned from major roads and are entirely operated for feeder services. Tricycles cover 223 sq.km. or 1/3 of Metro Manila with 276 terminals (usually on-road waiting space at the junctions of major roads). Its service coverage is small at the city centre but larger in suburban areas. It is clearly observed that tricycles further fill the gaps in the public transport demand and totally complements other major modes. On the other hand, pedicabs, born after the war but banned in the 1970s, revived their operation in the last several years and even operate illegally along major roads. However, their number is still relatively insignificant. The role of tricycle has been significantly played in Bangkok by the "soi-bike" or hired motorcycle which usually operate along roads called "soi" branching directly from major roads. The number of units was estimated to be roughly 18,000 in 1988 but is rapidly increasing as the urban area expands.
- e) **Development of the Rail Mass Transit System:** Finally in 1985, the first 15-km elevated Light Rail Transit System was constructed along the busiest north-south corridor of the metropolis, after urban rail mass transit was proposed for the first time in Metro Manila in 1972.

Although the LRT of Metro Manila is performing well, carrying a daily average of 350,000 passengers and is intended to be expanded further, its role in the total urban transport system is yet

limited. In spite of the good ridership level, the revenue can barely cover the investment cost; although it is good enough compared to other urban rail transit systems in the world.

While bus transport has been disorganized again, Metro Manila intends to restructure public transport system by expanding the rail mass-transit systems comprising LRT (Line 1, Line 2, Line 3, and so forth) and commuter service of PNR.

4. BASIC DIRECTION OF PUBLIC TRANSPORT DEVELOPMENT IN METRO MANILA

In developed metropolitan areas, urban public transport system has been developed, more or less, keeping pace with urbanization. Urbanization was associated with industrialization which made possible the availability of technologies and economic growth. Rail transit system was invented and constructed prior to the commencement of motorization which then helped to develop relatively efficient urban structure and more extensive basic mass transit system of the metropolises.

On the other hand, developing metropolises have been greatly handicapped in public transport infrastructure especially for adequate mass transit services. Rapid urbanization has preceded the development of transport infrastructure by the public sector where roads are often inadequate in standards and network configuration. Hence, road based public transport modes including varied para-transits, mostly operated by the private sector, managed to meet demands in some way. The gap between supply and demand of the road based urban transport system has been widening sharply in almost all developing metropolises.

It is almost certain from the experiences of many metropolises that road based public transport alone could not meet the demand, and mass transit system such as the commuter service of conventional rail transit, subway, LRT, segregated bus transit, and so on is badly needed. What is lacking in developing metropolises is an efficient trunk transit system while various secondary and feeder services are adequately available. This is in contrast to many developed cities where line-haul services are well provided but feeder services are often poor. Therefore, in spite of the number of difficulties, the governments of developing metropolises should mobilize available and possible technical, financial, and institutional resources towards the development of basic mass-transit network.

Metro Manila once had an extensive urban rail-transit network together with the abundance of the "calesa" which partly competed but mostly supplemented the TRANVIA. This could be revived in a modern way by constructing a basic rail-transit network and integrating it with the widely available road-based transit systems.

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