DEVELOPMENT OF PUBLIC TRANSPORTATION IN METRO MANILA

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ABSTRACT

Development of public transportation of a city is unique. Notwithstanding the rapid spread and availability of transportation technologies among countries, their choice and application differed, thus, resulting in different system structures. Accumulation of these processes built the present and will affect future urban transportation forms. An overview of urban transportation situation of selected Southeast Asian cities is presented and the historical development of public transportation for Metro Manila looked into.

1. URBAN AND TRANSPORT SITUATION IN SOUTHEAST ASIAN CITIES

1.1 Growth of Metropolitan Areas

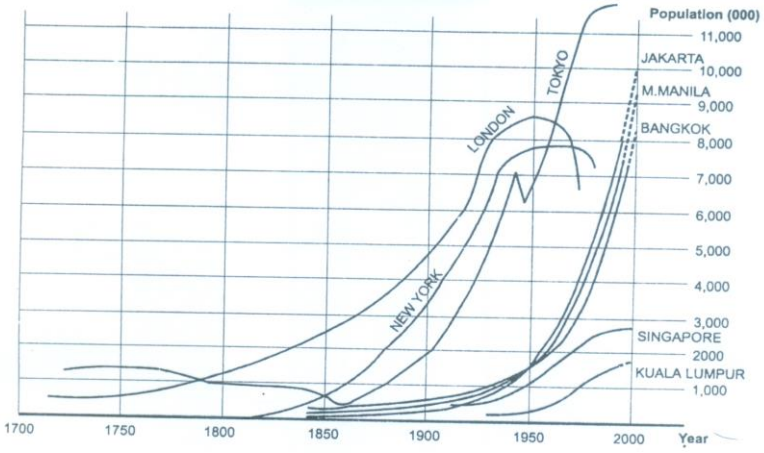
In terms of population concentration in urban areas, urbanization in developing countries progresses at a much faster rate than that in developed countries and this trend is expected to continue over the years without a significant slowdown (refer to Figure 1). Some of the characteristics of urbanization in developing countries are as follows: they do 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 precedes 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 rule, Bangkok in 1782, Jakarta in 1619 under the Dutch, and Kuala Lumpur in 1880 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. This 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



1.2 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 accelerate further as the economy improves. Car ownership ranges from the highest of 280 per 1000 population in Kuala Lumpur 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.

[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-fold; 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.

Table 1 Profile of Urban Transportation in Selected Southeast Asian Cities

Item	Bangkok	M. Manila	Jakarta	Kuala Lumpur	Singapore
1. Area : sqm					
1) Administrative	1,569	636	650	242	620
2) Actual Urbanized 1/	450	500	500	150	300
2. Population					
1) 1985 (1975) : 000	6.1 (4.1)	7.0 (5.0)	7.9 (5.5)	1.3 (1.0)	2.6 (2.0)
2) 1975-85 Growth: %/yr	4.1	3.4	3.7	2.9	2.4
3) Primacy (1980): %	69	30	23	27	100
3. Population Density: persons/ha	140	140	160	90	90
4. Economy					
1) Nation's Per-Capita GDP:US$	850('85)	590 ('85)	450 ('85)	1,810 ('85)	7,940 ('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
5. 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
6. Transport Demand					
1) Total No. of Motorized Trip/day : mil.	11.9 ('85)	12.5 ('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) 4/	61:39	25:75	51:49	66:34	46:54
4) % of Motorcycle to Total Motorized	18	neg.	20	19	n.k.
5) % of walk to Total Trips	15	34	47	28	n.k.
7. Public Transport					
1) Total Demand (000/day)	8,090 ('88)	n.k.	n.k.	n.k.	n.k.
2) Modal Share (000/day) 5/					
- Rail	20 ('88)	15 ('90)	21	neg.	neg.
- MRT/LRT	-	350 ('90)	-	-	365 ('88)10/
- Bus	6,090 ('88)6/	2,130 ('83)	1,776	1,130 7/	2,620 ('87)
- Paratransit	930 ('88)6/	7,420 ('83)8/	1,752 8/	466 9/	26 ('87)10/
- Taxi	780 ('88)6/	430	401 8/	110	n.k.
- Water	260 ('88)	neg.	-	-	-
- Non-motorized	-	n.k.	609 8/	n.k.	n.k.

Source: World Bank 1989, JICA 1984, JICA 1987, JICA 1988. JICA 1989, JICA 1990

1/ Estimated based on area by landuse.
2/ Converted based on following exchange rates at the time of the data in Local Currency;
US$1.0 = B25.0 = ₱21.0 = Rp1050 = M$2.5 = S$2.0
3/ Household Expenditure.
4/ Calculated by multipying 1985 population by trip rate (motorized).
5/ Motorcycle and taxi trips are included in Private.
6/ Bus includes minibus, paratransit comprises silor-leck, taxi; includes samlor and hired motorcycle.
7/ Taxi: includes 430 thousand of tricycle. Data on ordinary taxi is not known.
8/ Paratransit includes minibus and microbus. Taxi: includes 333 thousand of Bejaj/Helicak, and 68 thousand of ordinary taxi. Non-motorized is becak
9/ 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.
10/ It is estimated that about 900 thousand passengers will be carried when it is in full operation. Paratransit includes factory/school bus.

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, 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 motorized transport demand. The substantial and increasing motorcycle travel demand implies that the need for 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 will 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 center and elevated section in suburban 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

[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.

Table 2 Rail Transit Development in Southeast Asian Countries

Urban Area		System Outline	Status (as of 1993)
Metro Manila	E.S.	(1) Commuter service of PNR Main Line South. (2) Commuter service of PNR 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 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 implemented on BOT. Soft loan being sought. • To be implemented on BOT.
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 (BMTS 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 Jabotabek 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 a total length of 13 km by maximum utilization of the existing KTM (Malayan Railway) reserves and facilities.	• Planned.
	N.S.	(1) Construction of LRT Line 1 (18.5 km; 8 km viaduct, 10.5 km at-grade). Final total length of 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 Johare 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

Legend: E.S. : existing system
N.S.: new system

requirements, Governments not only introduce foreign soft loan but also aim to tap private sector 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 Governments especially in Metro Manila, Bangkok, and Jakarta. Integration and modernization of bus transport led 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 (Vuchic 1980) 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 cannot 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. (Ohta 1990) 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.

Table 3. Existing Intermediate Public Transport (IPT) 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	Jeepney	Bis Mikro	Minibus	Scheme A Scheme B (Minibus)

2. 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).

2.1 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. Approximate population growths were 2,000 in 1570 to 40,000 in 1620 and to 150,000 in 1830. (Holsteiner 1978) 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. (Reed 1978) 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 passengers. 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 planks and oars. This narrow and shallow vessel, when covered with leaves, is so cramped that it could only provide sitting room for passengers. The *banca* evolved to a vessel of plywood board and motor and became popular as fishing boats shortly after World War II.

On land, the carabao (an indigenous 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 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.

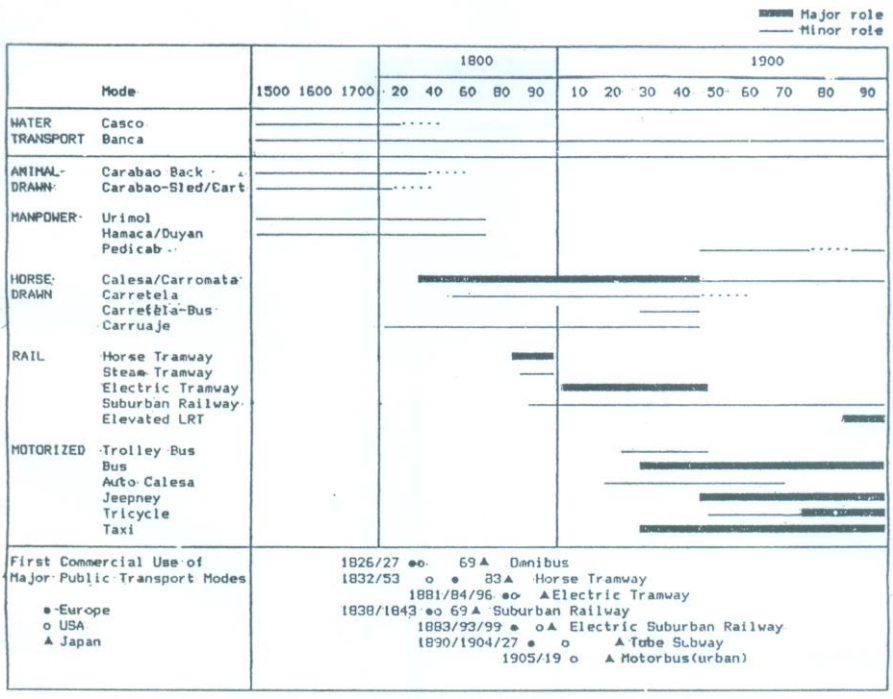
During the early part of the 1800s, urban transport situation for other metropolises was similar; Singapore had the bullock cart or ox cart, horse carriages, sedan chair, *redi* (hammock), etc., Jakarta had canals and various water transport modes, carriages, carts, water buffalo cart, sedan chair, *palanquin*,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

2.2 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 to 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 lifestyle of residing in the suburbs and working in the city center. Population of Manila alone increased

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

Figure 2 Public Transport Modes in Metro Manila



Source: Galang et.al. 1950, Vijungco 1984, Nakpil et.al. 1978, Felice, Roschlan 1984, and so on.

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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.
Urimol: 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 and uniformed cochero (coachman), later transformed to the existing 2-wheeled canopied type.
Carromata: 2-wheeled,drawn by one horse, canopied and with rubber tires, but commonly with cheaper/dilapidated bodies and unpadded bejuco 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.

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 center and making the Binondo area as the commercial and industrial center. 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 of roads were made.

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*.

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*[6/]**: During the same period in Tokyo, however, horse carriages never became popular in spite of its 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 designed for military reasons. It was only in 1863 and 1870 when the use of the cart and the *jinrikisha* were permitted. Vehicular traffic spread very quickly that around 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. (Rimmer 1988) 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

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5/ Hackney or *gharries* in Singapore; *dokar, sado, dolman, mylord, bendi*, and *andong* in Jakarta; etc.

6/ *Jinriksha* is a two-wheeled transport mode pulled by a man.

Jakarta and no record was found in Manila on this mode. One of the reasons could be attributed to the relatively widespread and use of the localized horse carriages in Manila as well as the policy of the colonial government that "jinrikisha" be considered inhumane.

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. (MERALCO 1969) 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 a single car 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 posed no threat to the *jinrikisha*, which was the main urban passenger transport mode during that time, but the horse tramway did. Although a political group composed 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.

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

a) **Urbanization Led by Rail-based Mass Transit**: The electric tramway, which was first put to practical use in 1888 and spread quickly in U.S. cities,[8/] where throughout the subsequent two decades, the 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,

[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 became popular in European cities after the 1860s only due to relatively strict institutional and regulatory constraints of the latter cities.

[8/] A total of 1,900 kms electric tramway was in operation in 1900 in the U.S. cities.

[9/] 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.

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 1905 (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;
- 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; and
- 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 electric power 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. (Forbes 1928)

b) **Emergence of Motor Vehicles**: The introduction of motor vehicles in the Philippines occurred relatively early, i.e. 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

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[10/] This means that daily ridership is about 35,000 and 126,000 passengers for the population of about 200,000 and 300,000, respectively.

[11/] In 1912, Manila had 1,026 motor vehicles including 628 cars, 259 motorcycles, and 111 trucks. (Bureau of Public Works Quarterly Bulletin)

[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.

superior in speed and convenience, soon became popular and started to threaten the operation of the *carromata* and the *carretela*, which 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 commenced in 1920. The trolley bus replaced the electric tramway in 1926. In Jakarta, motorcars appeared 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.

c) **Disappearance of Tramways**: Under these circumstances, the new construction and maintenance of the electric tramways became expensive and more difficult. MERALCO introduced the trolley buses 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 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 abandoned most of it by 1971. Only 12.2 kms of the route remained 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 outdated and the advantages of motorcars were emphasized by the automobile industry;
- Modernization of the electric tramways was not promoted by the Government; and
- Electric tramway companies themselves concurrently started bus operations.

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

[14/] There were 5,388 rigs in 1933.

[15/] Except for the engine and chassis which are imported.

- Electric tramways were normally owned by City Authorities and their organizational and financial status were relatively stable; and

- Motorization in Eastern European countries was moderate.

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

d) **Spread of Unorganized Bus Transport**: During the latter part of the *Tranvia* period, motorization made progress with the entry of organized bus operators 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. The Administration's capabilities decreased so much and numerous small operators, using all available vehicles, started to flood the city to meet the demand of one million population. Organized public transport, which developed during the American period, declined significantly.

2.4 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 Organizing 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 born mostly during the war period and were fiercely competing with each other for business. 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 air-conditioned and double-deck 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 priviledged 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; and
- 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 in 1959, which has grown to the present Bangkok Mass Transit Authority (BMTA). Government-owned PPD (Perusahaan Pengangkutan Djakarta) took over the bus and electric tramway operations in 1954.

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. (Grava 1972) 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 "jitney," dominated the post-war public transport of the metropolis. The success of *jeepneys* in Metro Manila is attributed to the following (Kurokawa & Iwata 1984):

- 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 an almost door-to-door service that is made possible by the well configurated road network of Metro Manila and the intermediate size capacities.
- 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 as 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*. Some of the Government's control measures were not favorable to the *jeepneys* such as the rerouting of *jeepneys* from major roads to secondary roads, which 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 rather in the 1980 person trip survey which 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 center but larger in suburban areas. It is clearly observed that tricycles further fill the gaps in the public transport demand and totally complement 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 though 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 and traffic congestions worsen.

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.

3. 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. As urbanization was associated with industrialization economic growth was attained and available technologies were easily introduced. Rail transit system was invented and constructed prior to the commencement of motorization in many cities.

On the other hand, developing metropolises have been greatly handicapped in public transport infrastructure especially for adequate mass transit services. 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 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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