

3335

## TRANSPORTATION ISSUES AND FUTURE CONDITION IN TOKYO, JAKARTA, MANILA AND HIROSHIMA

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**Abstract:** This paper deals with the discussion on transportation issues in four major cities in Asia, namely Jakarta, Manila, Tokyo and Hiroshima. Though they are located in Asia they can be stratified in different typology of development. Jakarta and Manila are closely similar and having similarities in socio-economy characters as developing countries in the region, the other two cities of Tokyo and Hiroshima are needless to say should be in the same cluster of developed country of Japan. Focus of looking at socio-economy or demographic background that triggers the development of transportation systems mainly in urban areas is discussed. Portrait of existing condition of transport infrastructures and facilities, and trend of development are interesting features to elaborate to give insight of what is in progress towards ultimate development of urban transport systems in metropolitan areas. Lessons learnt from different cities may be of good experiences to be shared so that similarities or dissimilarities can be observed and provide guidance in the transport development. In conclusion, it is expected that the discussion may provide comparative insight and sense for future transport development in some spectrums though the cities are different in nature.

**Key Words:** transport infrastructures, transport development

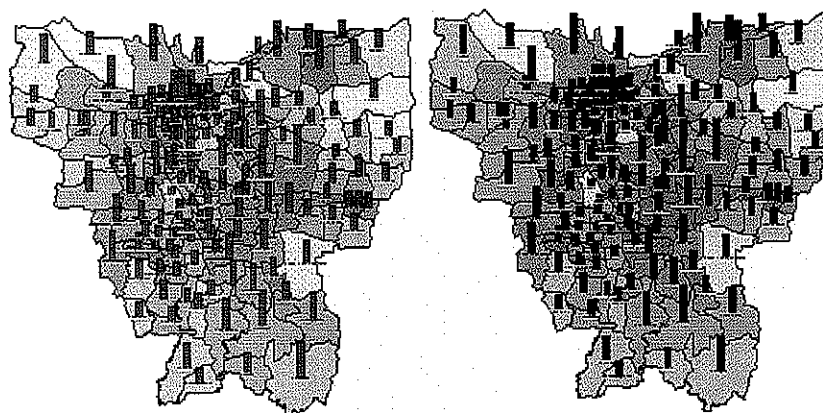
### 1. STRUCTURAL CHANGE OF RESIDENTS

As one of indicators indicating the need of transportation service is socio-economic background, and it can be reflected somehow by the structural of population and its change by years. Figuring out the need, it is interesting to know spatial distribution of population in four observed cities as followings.

#### 1.1 Jakarta City

In 1990 it was estimated that total number of population in Jakarta city was about 8.2 million, and this number was expected to grow continuously due to natural growth as well as migration for better expectation of economy and employment in the city. As an example the growth rate estimated in 1985-1990 was about 2.31% per year, and this rate was predicted to decline in the following years. Average growth rate of Jabotabek was estimated about 2.19% per year in 2000, but the absolute number would still be increasing to 23.3 million in 2000, and it would reach 32.22 million in 2015. As illustrated in Figure 1, it can be expected that significant increase in mobility of person and goods movement, number of motorized

vehicles, and traffic volume would evolve in a way of such spatial distribution of population. It is predicted that growth of population remains in the same patterns in as it moves from year 2000 to 2005. This stability is somehow influenced by the development of such population



2002

2005

Figure 1. Population Growth in Jakarta Metropolitan Area

and residential in the periphery or neighboring cities of Jakarta with the so-called JABODETABEK (Jakarta, Bogor, Depok, Tangerang, Bekasi) areas.

Though there is no strong policy on spatial development, the population growth seems to spread onto other

areas. And it can be predicted that the impact of Jakarta urban transport system would somehow influence or be influenced by the development in the vicinity. So it is clear that any macroscopic planning on land use as well as Jakarta urban transportation system should consider JABODETABEK as a whole. Connectivity of road network and other mode integrity are of crucial matters to accomplish sound transportation systems.

## 1.2 Manila City

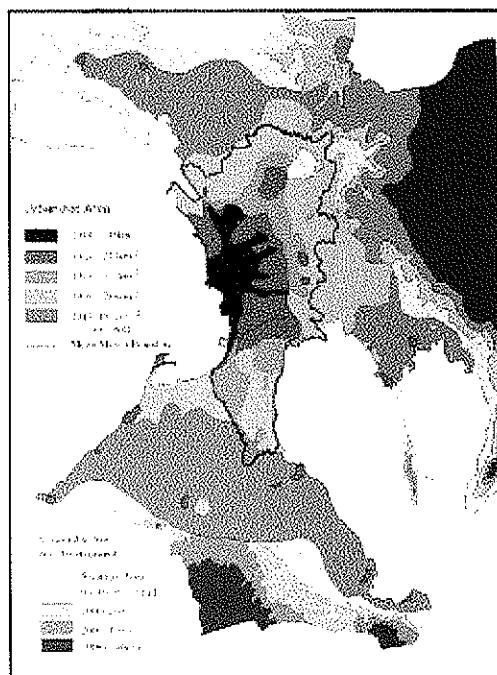


Figure 2. Expansion Pattern in Manila  
establishments of big commercial centers

As for the case of Manila city two emerging urban patterns can be observed in the Metropolis as a result of its burgeoning population: first is the advent of sub-urbanization. This trend became apparent in the early 1980s when the traditional centers of business in Metro Manila became densely populated and the quality of urban living was slowly degraded. As can be seen in Figure 2, urban expansion in the northern, southern, and eastern part of Metro Manila is expected to intensify by year 2015. The western portion is encompassed by the Manila Bay thus constraining development in that direction. This trend has led to an increase in the number of person-trips as well as trip distances, compounding the traffic woes of the Metropolis. Between 1980 and 1996, the average travel time for all modes of road-based urban transport has increased by more than 120%.

The second pattern seen is the proliferation of informal settlers in the city centers as well as the along EDSA and other major corridors. These

trends have caused congestion to worsen as well as to a highly mixed land use, leading to loss of urban amenity.

### 1.3 Tokyo City

The most important trends in Tokyo Metropolitan Area in recent decade are 1) Re-centralization, 2) aging population combined with the diminishing number of children. From 1970's, the government had promoted the decentralization

policies. Several suburban cities had been assigned as satellite cities and investments on the cities' development and transportation facilities connecting them had also been strengthened. However the serious recession during 1990's caused rapid land price decline in the central area. And now Japanese population has been drastically aging and diminishing number of children. These two trends invite "re-centralization" like as Figure-3. The population in central area has been increased from the end of 1990's, moreover, the government has promoted redevelopment projects in the central areas to seek more efficient investments. It is considered harmful that this trend would cause exhausted areas especially in rural areas in Tokyo Metropolitan.

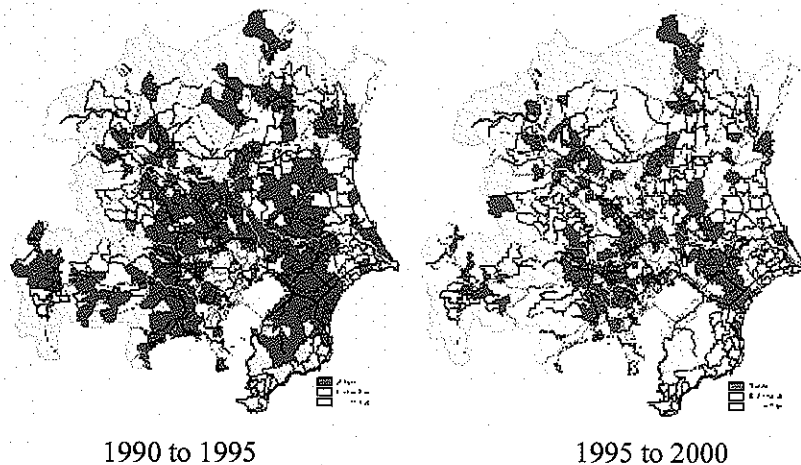
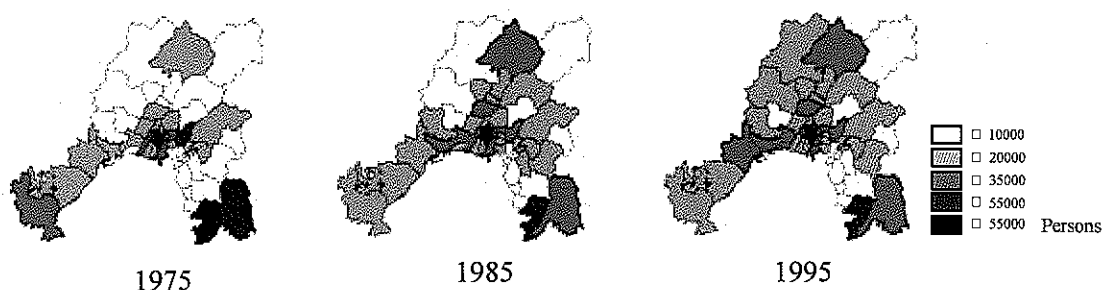
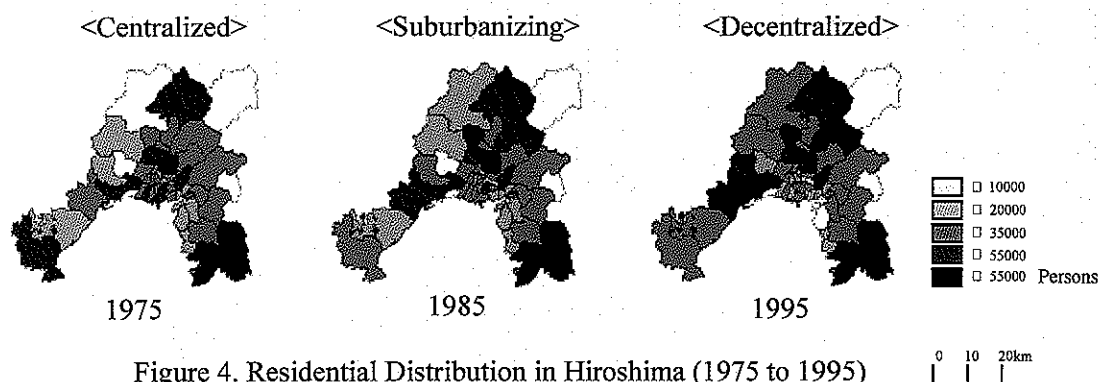


Figure 3. Population Increasing Rate in Tokyo Metropolitan Area

The structural change occurred in the end of 1990's has caused various distortions on transportation plans in Tokyo Metropolitan Area. Especially, the trend of aging population combined with the diminishing number of children invites the financial problems and the policy change from the decentralization to the re-centralization. This re-centralization may realize the better accessibility to the central area, however, it may cancel out the past endeavors for decentralization policies.

### 1.4 Hiroshima City

The Hiroshima metropolitan area has suburbanized remarkably during the last three decades, with gross population increasing 1.18 times from 1975 to 1995. The suburbanization of the residential and employment distributions between the years 1975 and 1995 can be seen in the figures below. The year 1985 shows a suburbanization of primarily residential areas, while 1995 shows a move to the suburbs of both residential and employment locations (Figures 4 and 5).



It can be considered that Hiroshima city though it may not have high density of population, but it has some tendency of high sub-urbanization due to the spread pattern of employment distribution and residential distribution as consequence. But one other factor may be considered to give such impact, that is the urban transport system either in the network as well as in mode development context. As can be learnt that Hiroshima may have less development of mass rapid transit as compared to other big cities in Japan like Tokyo, so it can consequently reduce the number of trips makers to travel distant, so it creates tendency of sub-urbanization to conserve the socio-economic activities.

## 2. TRANSPORTATION MODAL CHANGE

In the extent of knowing the need through spatial distribution of population, it is necessary to comprehend the supply side of transport system such as changes in the modal changes by years. This knowledge is important to determine not only the balance between supply and demand but also the integrity of network as well as modes.

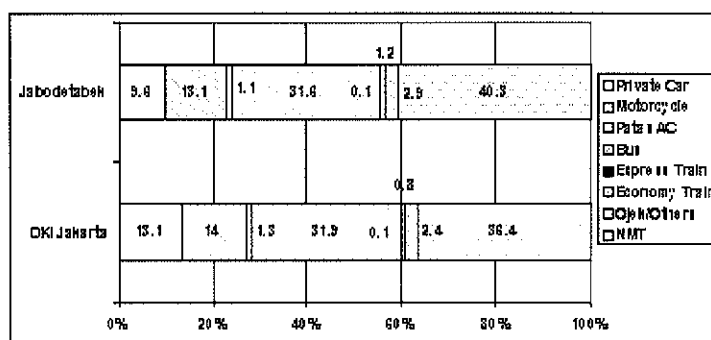


Figure 6. Composition of Modal Share in JABODETABEK and DKI Jakarta

## 2.1 Jakarta City

According to Jakarta Mass Transit System Study (JMTSS, 1992) the modal split of public transport was 49.1% and 50.9% for private vehicles. This figure was certainly different from the past estimation of ARSDS (1985) with share of 57% for public transport and the rest 43% for private vehicles. Again different figure could be expected from the previous study of JMATS (1972) that resulted in share estimation of 61% and 39% respectively. So there were declines in public transport patronage due to lack of capacity in the ensuing years. Furthermore, Figure 6 illustrates the share of modes based on SITRAMP- Phase II study by JICA.

## 2.2 Manila City

In 1996, the total number of person trips was estimated to be 30.3 million per day composed of 24.6 million motorized trips and 6.3 million walk trips. It was also observed that those belonging to car-owning households make 2.6 daily trips than those from non-car-owning households (2.2). On the other hand, public transportation modal share is remarkably high at 78% of all trips, with the jeepney retaining its position as the most popular mode of transport regardless of trip purpose (see Figure 7). Rail transport covers only 3% of the total transport demand in 1996 and mainly for work trips.

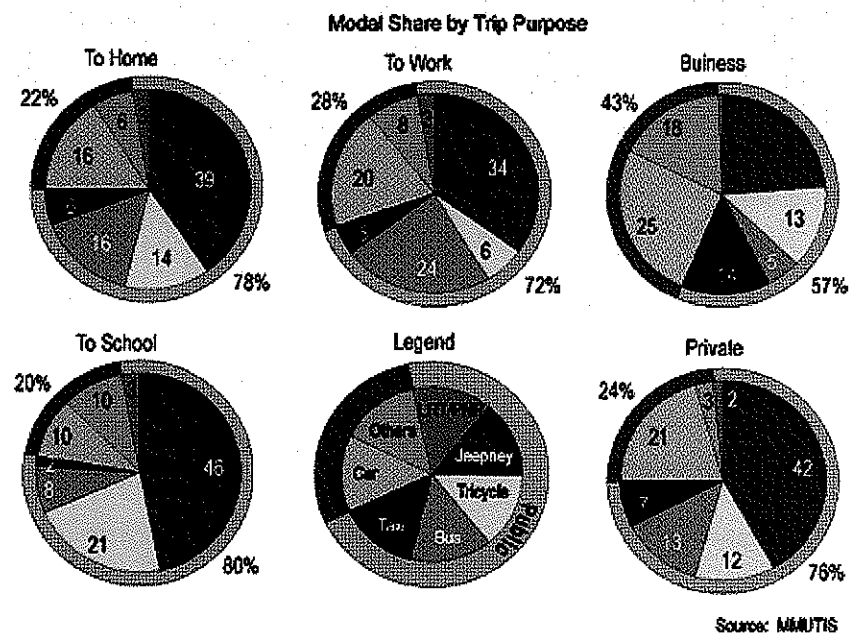


Figure 7. Modal Share by Trip Purpose in Manila

Yet, despite the high modal share of public transportation in Metro Manila in terms of catering to the existing travel demand, private cars dominate the traffic composition on all major corridors, accounting for 53.2% of the total traffic volume but caters to only to 21.6% of the total transport demand in terms of person-trips. This situation has worsened the traffic congestion in the Metropolis. As of 2001, the average travel speed in Metro Manila is estimated to be 15.1 kph. Although short-term policies to reduce car use in the major thoroughfares are now in place, such as the Unified Vehicular Volume Reduction Program (UVVRP), these are not sufficient to ease traffic congestion. There are no existing incentives for car users to shift to public transport due to lack of an attractive alternative. As mentioned earlier, rail transport, the perceived attractive alternative to private car, still caters to a

miniscule portion of the total transport demand. This could be attributed to the fact that the rail network is still incomplete and operation of each line is separate. Moreover, intra-and inter-modal transfer stations still leave a lot to be desired.

### 2.3 Tokyo City

The share of railway in central prefectures such as Tokyo, Kanagawa, Saitama and Chiba has still kept high rate. On the other hand, the share of passenger car in suburban and rural area has been growing. The trend of aging population also affects the modal share as follows: 1) slowdown of rail demand increase in the central area, 2) declining bus share in whole area as shown in Figure 8. Few years ago, the central government started de-regulation policies on bus operations, some bus companies stop their operations and the local governments should take a role to support the exist bus service for residents. In the end financial burden becomes one of the serious problems for the local governments.

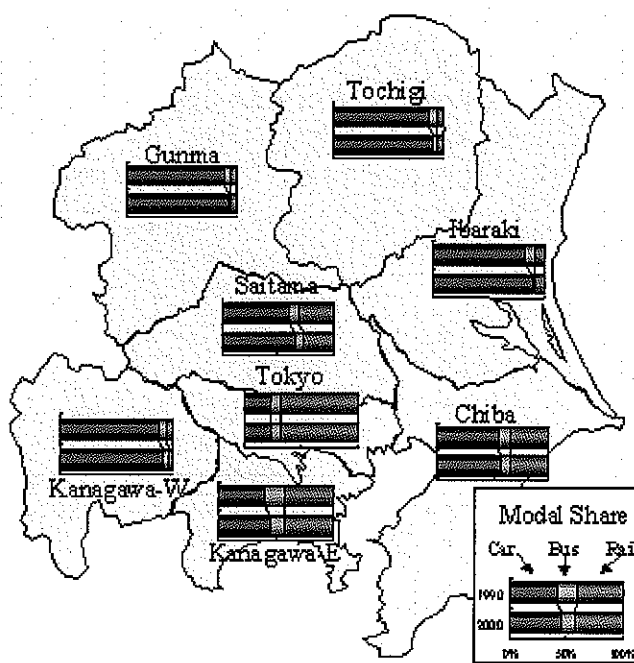


Figure 8. Modal Share in Tokyo Metropolitan Area

### 2.4 Hiroshima City

As the graph in Figure 9 shows, the share of public transport in Hiroshima went from 26.3% to 13.2%, and walking went from 43.3% to 27.4%. On the other hand, the share of cars and two-wheelers (bicycles included) went from 29.8% to about 60%. Levels of services for public transport are fairly high; however, ridership has been decreasing. So it can be said that Hiroshima is rather a car-dependent city in comparison with other cities of the same size in Japan.

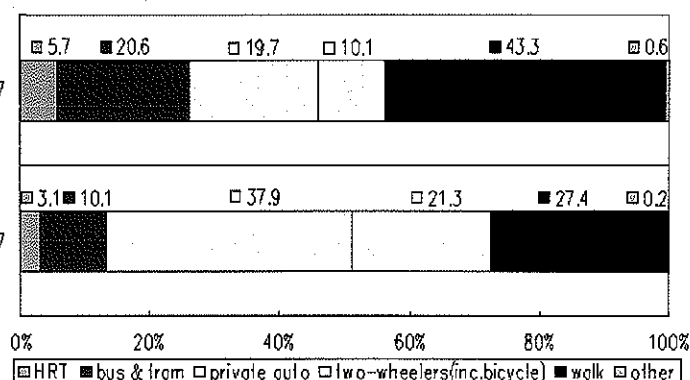


Figure 9. Modal Share in Hiroshima for 1967 and 1987

### 3. FUTURE PERSPECTIVE OF TRANSPORTATION SYSTEMS

#### 3.1 Jakarta City

Figure-10 shows the master plan of railway network of Greater Jakarta established in 2003. Development of MRT has been planned since 1987 and The Basic Design of the plan was conducted in 1994/1995. The economic crises 1997 has made this plan cancelled up to now. The railway network established in Consolidated Network Plan has not been implemented yet, however, the improvement of service of Greater Jakarta Railway still becomes a priority.

The most important subject in Consolidated Network Plan, which also mentioned in the Jakarta Master Plan 2010, is the development of East-West connection. Through the development of this connection, the whole system covering Western Line, Central Line and Eastern Line can be enhanced and fully integrated.

The road network plan for 2010 has been established properly as mentioned in Jakarta Master Plan 2010 by giving priority on the improvement of lanes and intersections (fly over construction) and finishing the construction of Jakarta Outer Ring Road. The construction of arterial road is focused on the "missing link" plan. The whole system of road network can be seen in Figure 11. Additional capacity to the road lanes such as road widening is optimally done to the trunk line corridors, which served most of public transport routes and those changes are not relatively affecting the hierarchy of road network.

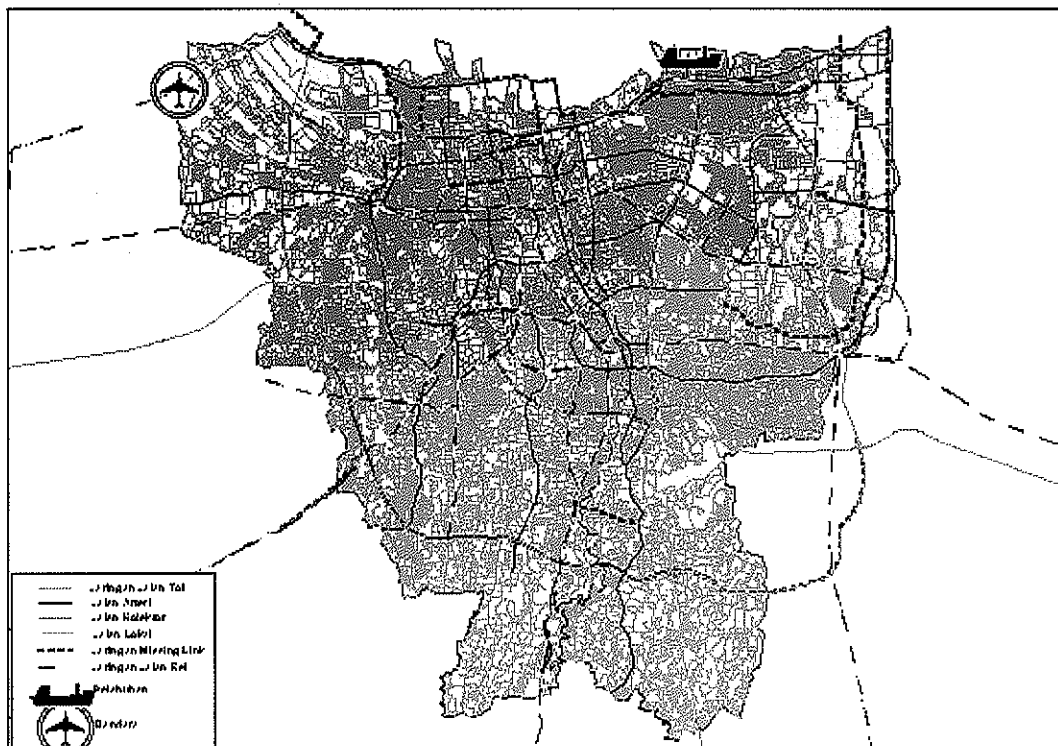


Figure 10. Future Rail Network Master Plan in Jakarta in 2000 Toward 2010

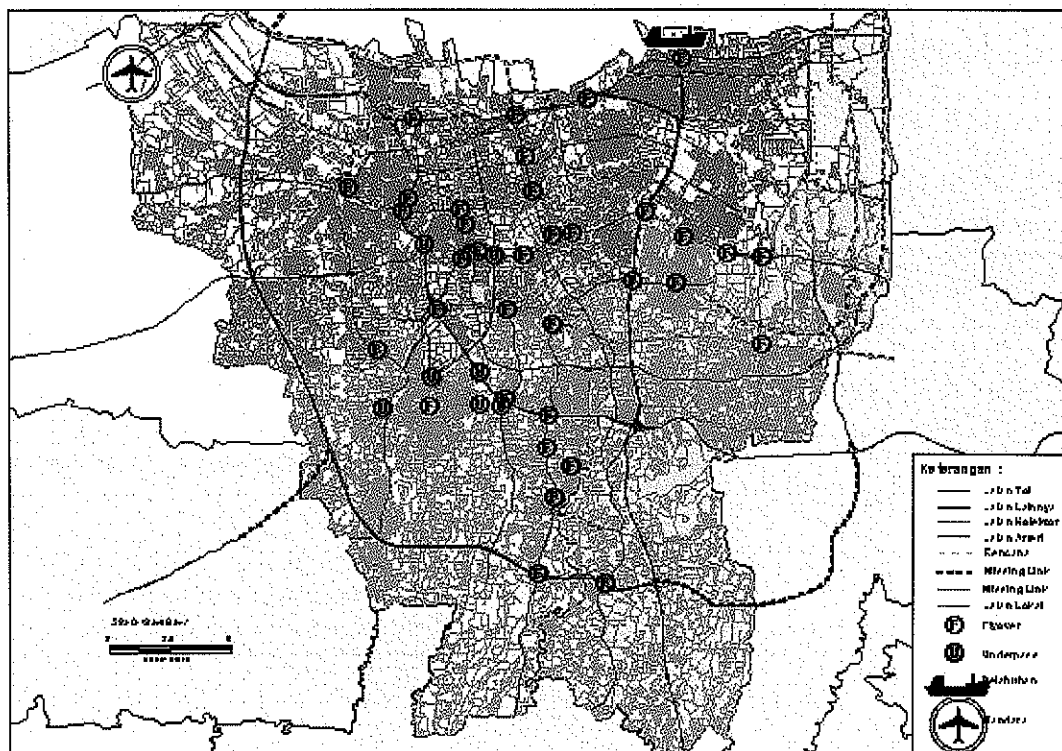


Figure 11. Future Road Network Master Plan in Jakarta 2000 Toward 2010

### 3.2 Manila City

Future policy directions in transportation sector applied in Manila are mostly emphasized on sustainable transportation. The policies are :

1. Strengthen traffic management capabilities and encourage use of mass transport  
The government is committed to implement efficient mass transportation system in the Metropolis (Figure 12), with consideration of intra and inter-modal transfer, in parallel with the development of effective short-term policies for reducing car usage.

2. **Emphasis on sustainability and private-public partnership**  
In her recent State-of-the-Nation Address, President Arroyo highlights the importance of private sector participation in infrastructure development

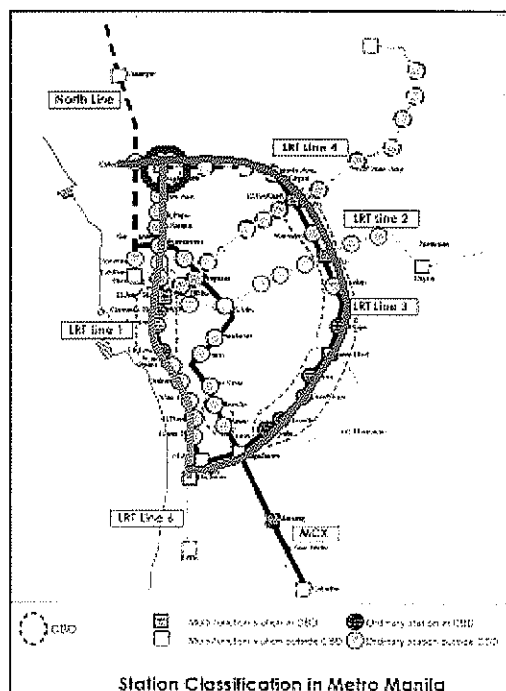


Figure 12. Metro Manila Mass Transit Masterplan



### 3. Sustaining Road Safety Initiatives

The Road Safety Action Plan aims to reduce the number of deaths due to road traffic accidents by half in the next 5 years. It also aims to improve road injury prevention through road safety education, better driver testing and training, and road safety publicity campaigns.

### 4. Promote pedestrian and non-motorized transport facilities

Initiatives to provide bikeways in suitable locations can now be seen in various local government units.

### 3.3 Tokyo City

One of the shortages in Tokyo Metropolitan road network is the lack of beltways comparing with other developed countries. Figure-13 suggests that the percentage of road network achievement in Tokyo area is quite less than other cities. This caused the excess traffic concentration to the poor of existing network, especially the western region in Tokyo. The plan of new beltways has been decided in the middle of 1960's, the lack of financial resources, the environmental problems and the citizen campaigns on the construction have been the barrier for the plans. Recently, Public Involvement (PI) process was introduced and the fare discussion started in several areas.

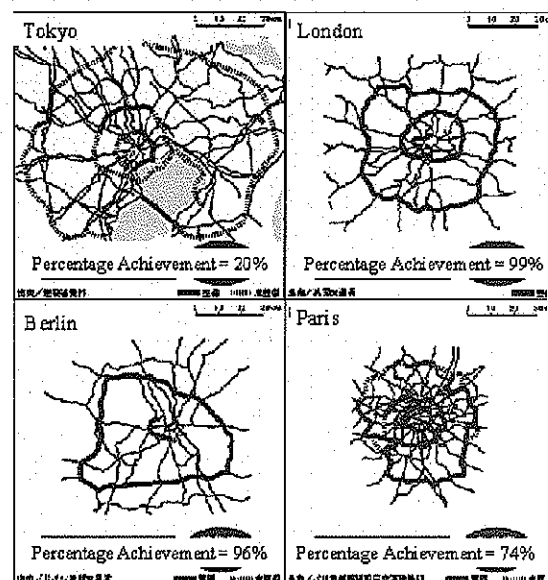


Figure 13. International Comparison of Beltways

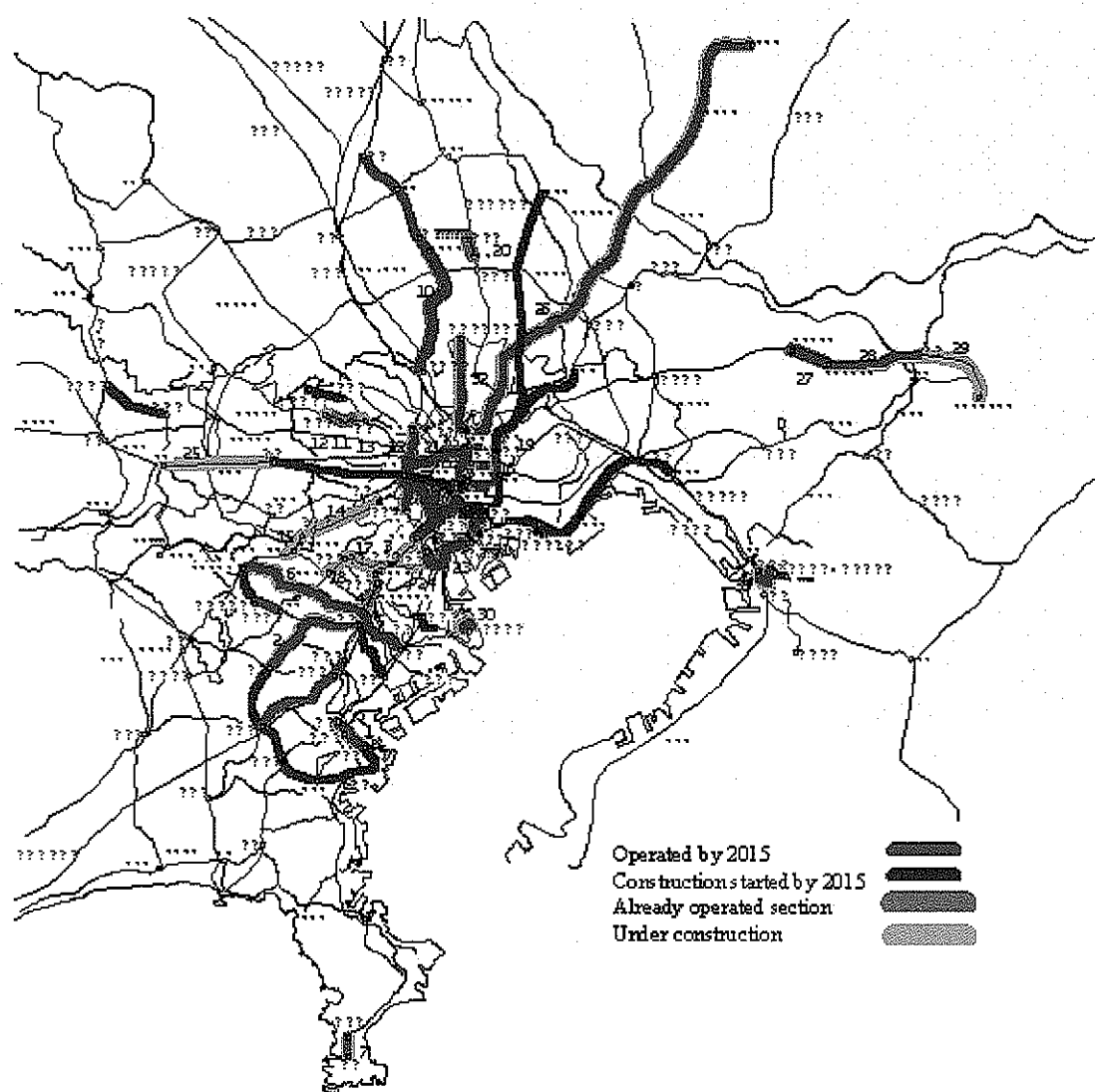


Figure 14. Future Rail Network Master Plan in Tokyo Metropolitan Area in 2000 Toward 2015

Figure 14 shows the master plan of railway network in Tokyo Metropolitan Area established in 2000. It suggested the future railways operated by 2015 and starting construction by 2015. Still the radial railways are planned or under construction, however, the trend of aging population as mentioned before might decrease the expected demand for new lines. And it is concerned that the forecasted demand would be over-estimation and newly operated railways would face the serious debt. To avoid this problem and keep the healthy operations, some policies like as the two-tiered system, separating construction of infrastructure and operating railway services, have been discussed. And now the emphasis on the priorities of railway policies is shifted from "link" infrastructure to "node" facilities such as barrier-free concept or connectivity between different modes.

### 3.4 Hiroshima City

The city Hiroshima is a leading one of local cities in Japan. After the second war, the city accomplished its urgent revival of urban functions including transportation services for a short

term. Consequently, the modal share for private car has remarkably increased for two decades since 1967 as in Figure 7, while intra-city road network planned in 1967 has still remained under construction. Furthermore, since the capacity of street car which takes charge of a main public transit is insufficient to the whole transit demand, it is required to expand the light railway lines to connect from outer city to center. The new master plan for transportation system in Figure 16 emphasizes the importance of improving both of road and public transport networks to keep proper balance as a compact sustainable city. Moreover, it is investigated that the levels of the existing street car and bus services should be improved for short distance travelers in the center of city.

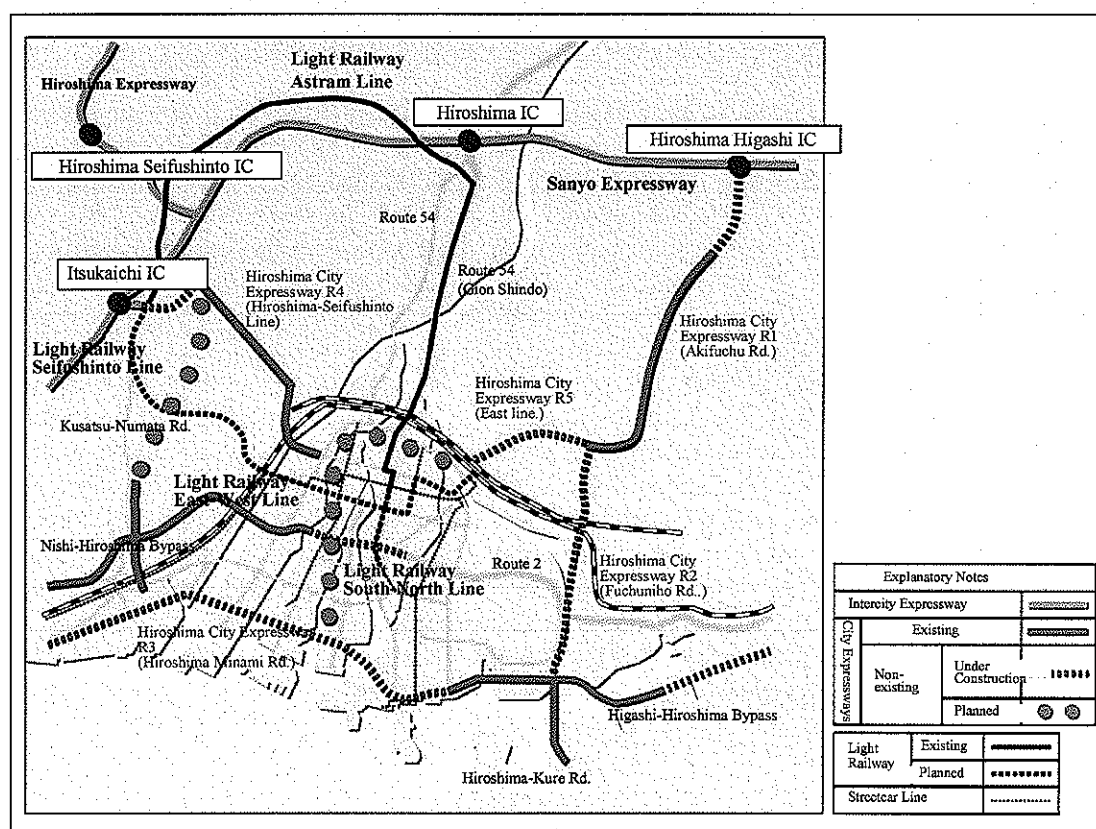


Figure 15. Future Rail and Road Network Master Plan in Hiroshima Metropolitan Area in 2000

#### 4. CONCLUSIONS

Brief elaboration of the four cities may denote some comparison that indicates the population growth, centralization, road investment, public transport investment and the resulted traffic congestion (see Table 1). Though the table is not conclusive, but it does give some insight on the influencing factors of needs or demands as well as factors of supplies in transport systems which are quite common.

Table 1. Comparison of Urban Transport Scheme in Jakarta, Manila, Tokyo and Hiroshima

Cities	Population Growth	Centralization	Road Investment	Public Transport Investment	Traffic Congestion
Jakarta	++	+	++	+	+
Manila	++	++	+	++	+++
Tokyo	0, aging	+, recentralization	+	+	++
Hiroshima	+	--	+	+	+

Notes: + = low  
 ++ = medium  
 +++ = high

Besides the comparisons shown in Table 1, some other qualitative conclusions can be made as followings.

It is an interesting insight to have the elaboration on four different cities in Asia with different socio-economic and development levels. Jakarta and Manila can be considered as developing cities, and Tokyo and Hiroshima can be considered as developed cities. As can be expected the two clusters denote the impression of such development and similarities, it is however seen also that the two clusters may have some dissimilarities on existing condition and future development due to the inherent nature of demography and urban characters that have evolved for quite years.

Jakarta and Manila are still lack of urban public transport services due to the long development of road networks that accommodate mostly the private vehicles. This situation must somehow be bound by the past policies of urban development that may involve other sectors that contribute transport demand in the urban areas. Starving from such discrepancies of development that result in urban transport problems such as congestion, the two cities denote the tendency of future approach of urban transport development towards the demand management measures. One of such measures is the intensive development of public transport, though still put the emphasis on bus system and other small and medium class of capacity. The very distinctive situation of such public transport system, as compared to other developed cities, is mostly on the existence of para-transit in the developing cities unlike the developed cities that emphasize on the higher capacity and fixed route public transport.

Some argument may also be made for the two cities that development of mass rapid transit is still considered too expensive to finance, and not very much supported by the existing condition of infrastructures that have evolved for decades. The lack of finance is however tried to be resolved by involving the partnership of private sectors to ease the development, but it is somehow a long way to go to achieve since public transport is a public domain anyway.

As for Tokyo and Hiroshima which are considered in the same cluster learnt to have similarities in level of established public transport though in different composition of modes. Tokyo has shown maturity of railway development as mass transit, and it seems now to look somehow at the emphasis of development road network that is still considered lack. This lack of road network is however uncomparable to the one in Hiroshima since they are different scale in size. On the other way, Hiroshima has put strong tendency of urban transport development with focus on private vehicles. The development of medium size of public transport such bus and tram is, of course, a long story embedded in the character and nature of the city. So it is apparent that Hiroshima city, unlike the Tokyo counterpart, would remain with the condition of priority of maintaining the non public transport system, and this

condition is very much in line with growth of dispersity of the city in employments as well as residentials.

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