

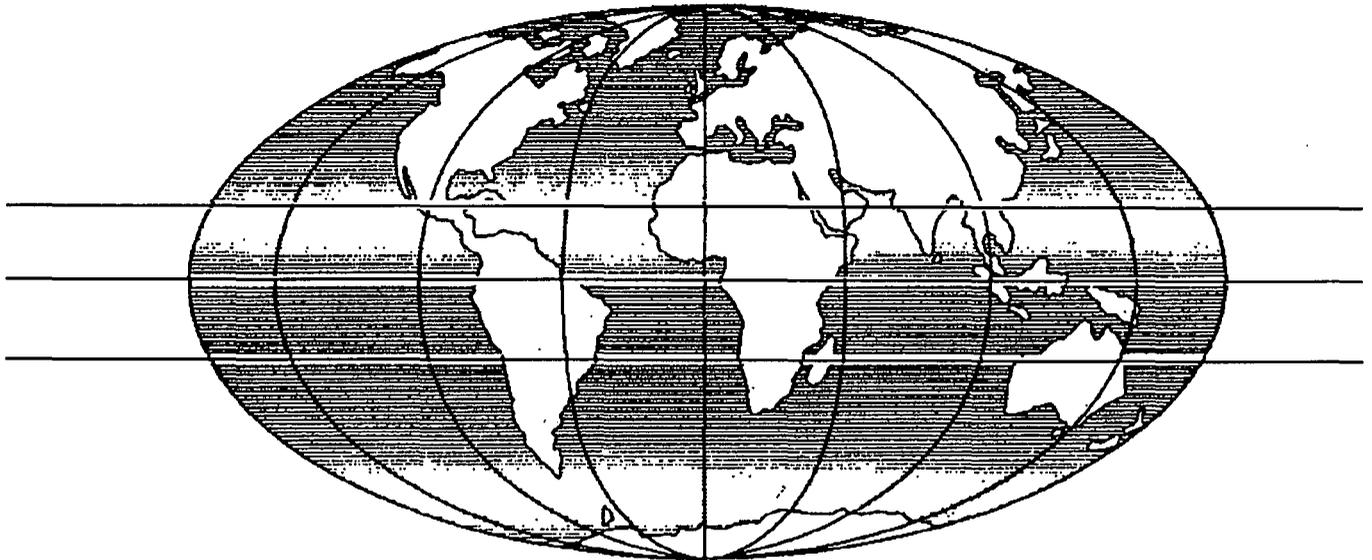


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THE NEED FOR INVESTMENT IN URBAN PUBLIC TRANSPORT

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In the 1950's less than one third of the world's population lived in urban areas. by the year 2000 it is forecast that this proportion will rise to over 50 per cent. In other words, more people will be living in towns and cities than live in rural areas. Nowhere is this dramatic rise in urban growth seen more clearly than in the cities of Asia where annual growth rates of 4-5% are common. This in effect means that cities are doubling in size in less than 20 years.

Estimates have also shown that cities of Asia are major generators of wealth and that by the turn of the century, these cities will be creating up to 80% of total gross national product. It is essential therefore that cities such as Kuala Lumpur, Jakarta, Hong Kong, Bangkok, Singapore etc operate as efficiently as possible. This in turn demands that these cities have efficient public transport systems.

In most cities, public transport is still road based with relatively few operating light or heavy rail mass transit systems. This paper examines briefly how public transport, in particular mass transit can most effectively operate in cities of Asia and what the implications are for sound investment. Use is made of research carried out by the Transport Research Laboratory (TRL), particularly by Fouracre and Gardner and their work is duly acknowledged.

In the late 1980's and early 1990's, the TRL reviewed transport policies in major Asian and African cities where metros were in operation or planned (Thomson et al 1990). This showed that the use of traffic management was universal in the 21 cities surveyed, and most had some form of urban traffic control (UTC). Parking restrictions were common, but generally not well enforced; furthermore, parking fees were usually too low to have any significant impact on car-use. Only Singapore made a serious attempt to restrain the use of cars, though Hong Kong,

and to a lesser extent some other cities, imposed high motor taxes in order to restrain car ownership. Bus priority measures, as part of traffic management schemes, were little in evidence; six cities had actually abandoned bus lane schemes because of poor enforcement.

All the 21 cities in the survey were investing a high proportion of their resources on transport infrastructure, involving major highway construction etc.

This paper presents a brief review of two options for mass transit in Asian cities; either buses with some form of priority (a relatively cheap option) or light or heavy rail systems which provide a high quality service but are expensive to construct.

Bus Priority Systems

The main feature of bus priority schemes is the separation of buses from other traffic, with bus lanes involving 'paint and signs' to indicate priority whilst busways involve construction which physically segregates the bus lanes from other traffic. A busway may be introduced as part of a traffic management measure, without any parallel improvements to bus operations and management but busway transit usually involves a range of measures with the overall aim of promoting high output from bus-based transit.

The advantages of busway schemes can be identified as low cost, (less than US\$1 million per Km for basic infrastructure), high local content (ie little foreign exchange), relatively high capacity, good commercial speeds, flexible routing and the fact that they can be developed in stages. The disadvantages are that the systems are not 'high profile' (as in the case of metros), there may be environmental hazards, they reduce road space for other traffic and they require a high level of coordination between various authorities.

Surveys undertaken as part of the TRL study (Gardner and Fouracre, 1990) have indicated that some existing busways achieve very high bus and passenger throughput (numbers of buses and passengers handled per direction per hour). Maximum recorded passenger flows were 26,000 per hour per direction (in Porto

Alegre, Brazil), at speeds of around 20 kmph. From an analysis of each busway it was apparent that the main factors associated with average speed were bus stop and intersection spacing. In the city center sites where stops and junctions occurred frequently, average speeds were around 11 kmph. On the suburban busways where longer distances between stops existed, averages of around 21 kmph were achieved. Furthermore, the provision of special operating features (overtaking bays, bus-ordering and trunk-and-feeder systems) was also associated with relatively higher speeds.

At the present time, the public transport system in Malaysia is totally dominated by buses but there are very few bus priority measures in operation. If we take Kuala Lumpur conurbation as an example, there are four categories of buses in general service:

- stage buses
- minibuses
- express buses
- special buses

Stage buses provide the backbone of the system with some 900 buses in service every day on approximately 180 routes. In total they carry upwards of 200 million passengers per year. Similarly, minibuses now operate throughout most of the conurbation and there are now more than 800 minibuses operating daily. However, there are no special priorities for these except for one or two bus lanes and bus only turns. Bus services are seen as being very poor, with the travelling public perceiving them as over crowded and unreliable. The bus system is now seen as being at a critical stage.

This is acknowledged by the authorities and there are a number of initiatives planned or being implemented including:

- an amalgamated and upgraded bus system;
- a new light rail transit system;
- an upgraded suburban rail system.

Mass Transit Systems

Metros are justified on the basis that they improve the quality of public transport (the existing bus services being slow, crowded and uncomfortable) and that the metro would relieve traffic congestion problems by replacing buses and attracting motorists from their vehicles. There can be little doubt that the first objective has been achieved, but there is little evidence of any long-term reduction in road congestion. None of the metros covered in the TRL survey (Fouracre et al., 1990) attracted more than a very small proportion of motorists, and any road space consequently released was quickly taken up by suppressed demand.

The TRL study showed that Metro's have rarely matched the expectations of their planners. Apart from the problems of implementation which have often led to substantial time and cost over-runs, the ridership on metros has usually been below that forecast. This means that the financial performance of metros has been largely poor; both capital and operating costs have generally exceeded estimates, often by a large margin, while patronage and revenues have fallen short.

Metros, like any other major city investment can be used to influence land use development. With a few exceptions however, little development has been positively promoted by governments, or by the private sector to exploit the metro facilities. The real impact is permissive in that the metro permits the city center to develop freely in response to market forces. The alternative, decentralized development, also has attractions, but can also entail costs in terms of continuing, chronic overcrowding of buses on the main radials and additional transport costs caused by cross-city traffic generated by the location patterns.

While metros are poor investments in financial terms (revenues covering costs), in the wider economic sense (taking account of, for example, the valuation of time savings to both users and non-users) most Third World metros have been quite successful. Table 1 summarizes the results of the TRL economic analysis of 13 metros. The best returns were in Singapore and Hong Kong, which clearly no longer merit developing country status. However, the majority of cities have achieved economic internal rates of return of between 10-15%, which is respectable, though not outstanding. The beneficiaries of the metro investment are

largely existing public transport users: either those who switch to the metro, or those who remain on the bus transport. Together their time savings account for almost 75% of the benefits.

Evidently metros can be justified in economic terms where certain conditions hold. These include: the existence of a high-demand corridor (probably above 700,000 passengers per day) which can no longer be served by bus transport alone; a high city income (probably above US\$1,800 per head) with good growth for both income and population; a record of achievement in transport developments.

TABLE 1: Economic Evaluation of Metros in TRL Case Study Cities

City	Capital Cost \$mm	Trips/day in metro corridors (000s)			EIRR %
		base year (without metro)	evaluation year:		
			total trips	by metro	
Cairo	526	830	4963	2110	16.8
Calcutta	684	736	992	400	2.8
Hong Kong	5051	2059	9121	3489	18.5
Manila	563	2250	3309	853	11.4
Mexico City	1974	4056	10184	6003	11.4
Porto Alegre	278	567	850	375	8.9
Pusan	680	2273	3616	664	14.2
Rio de Janeiro	2219	2100	4299	1700	7.1
Santiago	940	2302	2700	900	13.5
Sao Paulo	2280	2368	11245	3651	10.7
Seoul	5240	1127	12705	2897	14.7
Singapore	2502	1391	3961	1260	20.5
Tunis	231	162	1728	700	12.4

- Notes: 1) capital costs are in 1986 dollars and refer only to the lines tested;
 2) base year is first full year of operation; evaluation year is 20 years after completion of investment.

The Kuala Lumpur conurbation currently has a population of some 3 million with an increasing tendency towards urban sprawl. The average per capita income is approximately US\$4,000 per year and growing rapidly. This level of development suggests that there is room for an affordable fixed rail 'mass' public transport system to augment an upgraded bus system.

The relatively low densities and urban sprawl development in the conurbation indicate that there are not the high demand corridors to justify a metro type system. However, there is sufficient demand to justify a light rail transit system. As a result, the first line of the LRT system is being implemented along one of the most densely developed corridors - the Ampang corridor. On opening in 1996 this is forecast to carry 240,000 passengers per day, increasing to 390,000 passenger per day in 2010. Further extensions are planned which will provide Kuala Lumpur with an effective LRT system. However, in the short to mediums term buses will still continue to be the main mode of transport for the majority of public transport users. It is, therefore, essential that the whole public transport system (including suburban rail) is planned and operated in a coordinated manner.

Comparing the Options

The way in which public transport modes are separated from other traffic has a direct impact on the capacity and speed of mass transit operations. Bus ways allow buses to carry perhaps double the passengers of an equivalent on-street system, and at twice the speed. Similarly metros (even those using light technologies) have a significant advantage over trams which share road-space.

The high passenger carrying capacity of metros is a function of station spacings (much longer than distances between bus stops), minimum headways, the use of pre-paid tickets and multiple access doors. Conversely of course, buses have only one entrance and one or two exits. The additional carrying capacity of metros must be off-set against much higher construction and operating costs. An advanced busway system (excluding vehicles and terminals) may cost US\$1 million per Km. With an elevated track, costs may be about ten times this. The cost of a metro

system may be US\$20 million per Km for an at-grade system to US\$100 million per Km for an underground system.

As well as high construction costs, metros are also characterised by high operating costs. (Armstrong-Wright). These can be 5 times greater per passenger-Km than a bus system.

Apart from costs, the advantages of busways over metros are that of flexibility and familiarity. Thus busways can change alignments fairly quickly in response to changing demands and most Asian cities have a great deal of experience in bus operations. Conversely, relatively little experience exists in constructing and managing metro systems.

Interestingly, however, although most cities rely almost completely on buses, they receive relatively little support in the way of priority measures. Because there tends to be no single supplier of both buses and the track (or network), busway transit does not have a 'natural promoter' in the way that metro schemes have.

The construction of a metro system is clearly a very expensive process particularly so for a city with scarce financial resources. However, in large cities there may be important corridors of movement where there is no realistic alternative to metro. In the right conditions, the TRL study has shown that such a metro system would achieve a respectable economic rate of return. In similar cities and along lower demand corridors, busway transit could equally well meet the requirement. (Of say up to 25,000 passengers per hour per direction).

Technological developments add to the basic choice between bus and metro; guided busways, at-grade LRT, and lighter metro systems are increasingly being considered as possible development options. However, more research needs to be undertaken to establish their performance under different conditions.

Funding sources will obviously be critical to any new development. Finance packages from the aid agencies and manufacturers of industrialized countries seem readily available for metro projects, but unfortunately, there seems little encouragement for busway projects. The evidence from the TRL study suggests that

there should be greater support for busway projects. Apart from passenger carrying capacity and cost, another important issue to consider is the effect of a new system on the development of city structure. A new metro system is, of course likely to have a much more profound effect on the development of city structure than a busway.

In terms of sources of funding, there is no doubt that the private sector is and can continue to make a major contribution to public transport operations in Malaysia. They already provide the bulk of existing bus services and are now entering into the provision and operation of the light rail system for Kuala Lumpur. Private sector consortia are also looking at the providing light rail systems in other locations in Malaysia and are also considering the provision of transport termini and integrated developments at these.

In Kuala Lumpur, radical changes to the public transport system are being implemented. The proposed amalgamation of the stage bus services, changes to minibuses operations, LRT system and the upgraded suburban rail services are all welcome initiatives. Whilst each of these services can be managed separately, there is no doubt that if the full benefit of these systems is to be fully realised then they will need to be planned and operated in a totally integrated manner. This might include the eradication of wasteful competition, fares and ticketing integration and using minibuses as bus feeder services to the LRT system. The planning and monitoring of the component parts of the system and the necessary integration requires some form of Public Transport Authority to take a leading role. This agency does not need to operate the buses itself nor necessarily to own and operate the rail system, but it must have clear powers to plan, procure and promote public transport with adequate funding. In our view, the coming of rail transit systems considerably strengthens the arguments for such a Public Transport Authority.

One final point, most of us have seen how the bus system has deteriorated in Kuala Lumpur to the point where it is now seen as providing a poor service. To a large extent this is as a result of inadequate investment on the part of the private operators. One has some sympathy with the operators because bus fares have not been allowed to rise for many years. Clearly, major investment is now needed in

both the bus system and the fixed rail public transport systems. This can only come about if private operators are allowed to charge realistic fares. This means that the travelling public will have to pay higher fares. However, we believe that provided users can see they are getting a much better service then they will be prepared to pay for these.

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