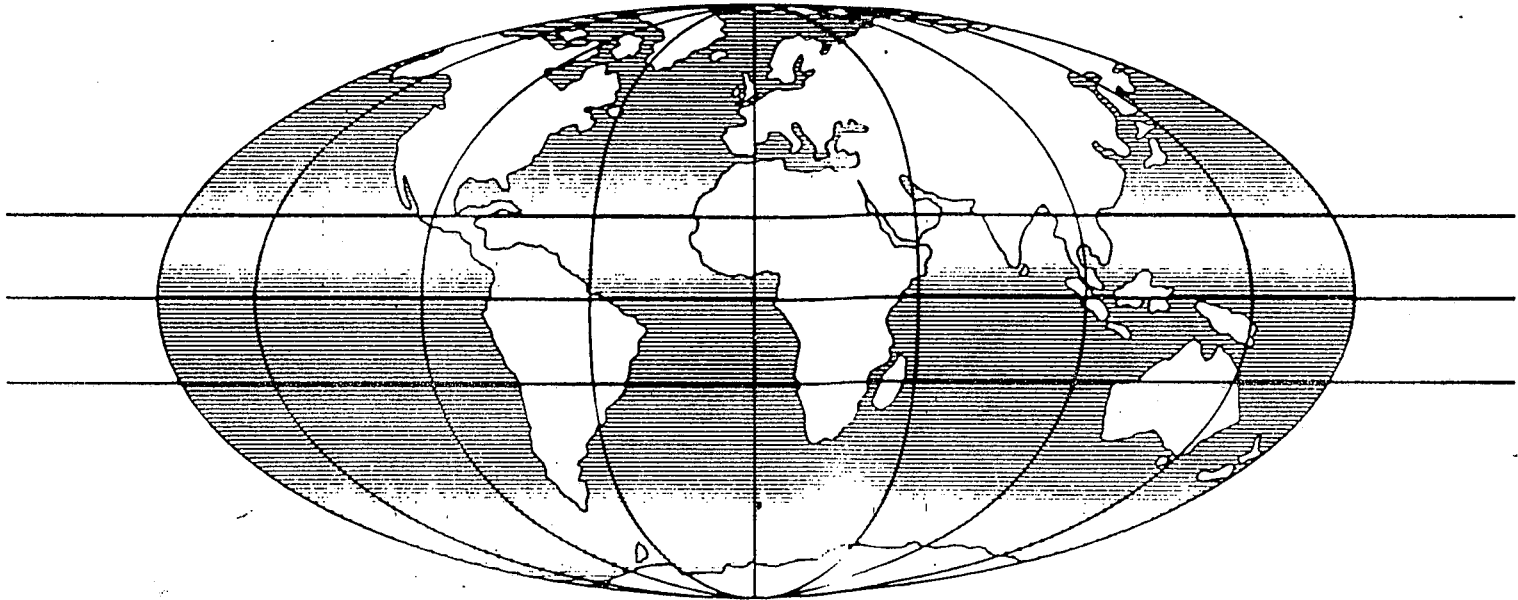


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Policy options in third world urban public transport



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POLICY OPTIONS IN THIRD WORLD URBAN PUBLIC TRANSPORT

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1. **Introduction.** Between 1980-2000 much of the world's urban expansion will take place in less developed regions (LDRs). UN forecasts indicate that during this period the urban population in settlements of more than 100,000 population will increase by over 100 per cent in LDRs as compared to only about 30 per cent in more developed regions (MDRs). Of the 57 cities expected to have populations in excess of 5 million by the year 2,000, 41 will be in the LDRs and 18 will be in the very poorest countries, where income per capita is below \$360 per annum.

Currently the 340 million urban dwellers in cities of over 1 million population in LDCs undertake something like 4.500 million trips per day, of which perhaps 30-40 per cent will be by some form of public transport. The additional 600 million inhabitants expected to settle in these, and similar size emerging cities by the end of the century will add not only proportionately to total trip making (assuming that present rates of trip making per capita do not change appreciably) but more than proportionately to the total person-kilometres generated. As cities expand in size and area, so trip lengths will undoubtedly increase and as a consequence, person-kilometres, which for transport operators is a more relevant expression of transport demand will increase at a faster rate than person trips.

Though personal motorised vehicle ownership is likely to increase with some rise in real incomes, and continue to be concentrated in urban areas, walking, cycling and public transport will remain the most important modes of urban travel in the Third World. With increasing city size the burden of commuter trips will increasingly fall upon public transport as longer trip lengths will discourage walking and cycling as convenient alternatives.

Urban transport policy in the Third World will be increasingly directed to how best to fulfil this growing demand using current and proposed public transport facilities. There will also be increased awareness of the possibilities for managing demand such that the burden on public transport facilities is minimised. This paper looks at some of the policy options available for the development of public transport in the Third World, and assesses likely performance based largely on case study material collected by the Overseas Unit of the Transport and Road Research Laboratory. Much of this material relates to India, but is relevant to many other countries. The paper begins with a brief resume of the characteristics of public transport systems currently operated in the Third World.

2. **Public Transport Characteristics.** Public transport in Third World cities comes in a variety of physical and organisational forms. Conventional, standard public transport buses are currently being operated in all cities of more than one million population, but there are far fewer tram, trolley-bus or metro systems in use in LDRs as compared to MDRs. For example, whereas 80 per cent of cities in MDRs of more than 2 million population have metros, only one quarter of similar sized cities in LDRs have such a facility. The supply of conventional buses is usually much smaller in the Third World: typically there are 10 to 30 buses per 100,000 population in Third World cities as compared to 50 to 80 buses per 100,000 population in European cities.

Many cities have a large component of unconventional or intermediate public transport (IPT) - minibuses, converted utility vehicles, rickshaws; some cities of under one million population are

solely dependent on these vehicles for the provision of public transport services. The contrast in institutional framework between the operators of conventional vehicles (sometimes referred to as the corporate sector of public transport) and IPT (the unincorporated sector) is sharpened by the profitability of the two types; privately owned small fleets of IPT, often owner-driven, are profitable whereas conventional buses, usually organised in large fleets and often run by local or central government, are seemingly difficult to maintain as a commercial enterprise. The decline in real fares, a situation facing the corporate sector in many Third World cities, only adds to the increase in demand for more, cheap public transport, which operators are unable to meet in a satisfactory way. Operators who cannot even cover their operating costs from fare revenues are in a difficult position to fund the investments required to meet ever growing demands.

IPT can be seen as a means of partially (or substantially in many cases) filling the gaps in service that are not provided by the corporate sector. Although vehicles classified as IPT are by no means homogeneous it is evident that the roles they play can be closely identified with those of either the classic taxi or stage-bus, as operated in the developed world. In the taxi-like role the vehicle is hired to carry the user from any point to any other point within the city, at a charge fixed by meter or bargaining. In the bus-like role the vehicle is used on relatively fixed routes with recognised stopping points along the route; fares are charged for each person using the vehicle, and the rates are pre-set for given trip lengths. Fares are closely associated with the role being undertaken; vehicles used in the taxi-like role have relatively high charges while those used in the bus-like role have relatively low charges.

A comparative analysis of the output of public transport in medium size cities of India (Fouracre et al, 1981) suggests that in the majority of cases IPT accounts for at least 30 per cent of output (measured in terms of passengers carried) and may account for 80-90 per cent in a small number of cases. The importance of the role of IPT is not accounted for by city size; some larger Indian cities have as high a component of IPT as much smaller cities. Taking public transport as a whole, however, it can be generally stated that its provisions increases with city sizes.

Conventional bus operators in the larger Indian cities play a significant part in the movement of large numbers of travellers. They have increased their capacity to meet the inevitable growth in demand for public transport services. However, there has been no evidence of any economies of scale, and inflation has advanced unit costs of operation, while at the same time fares have been kept artificially low by central and local governments for socio-economic reasons. As a result, losses are being incurred on urban services which are either cross-subsidised from more profitable operations, such as inter-city routes, or are covered by government loans on which interest is payable. Little internally generated finance is available for investment in city bus operations and operators must rely on whatever government support they can get, or employ the cast-off vehicles of the more profitable operations. Consequently, service levels either stagnate or deteriorate.

In India the operating environment itself is often a constraining factor on conventional bus operations. In the old historic centres the road network is often tortuous and narrow. All forms of slow moving vehicles and street vendors use the limited network, causing chaotic traffic conditions. The newer parts of the city are often planned with little consideration of transport requirements. Many people living on the periphery of cities are those of low income; they have little paying capacity and yet must travel long distances to work. Inevitably the bus operator is burdened with the task of providing cheap transport for these commuters. This compounds the problem, since the provision of cheap, long-distance transport encourages more low-income groups to live out of the city in suburbs where house rents are also cheap. In summary the problems likely to be encountered within the public transport sector of Third World cities broadly concern:

- a dependence on public transport for means of travel, which becomes more onerous as cities expand in size, the demand being largely generated by low-income commuters who have little paying capacity.
- poor financial performance of conventional bus fleets, usually associated with declining real fares and sometimes associated with inefficient output or declining productivity.

— a multiplicity of public transport modes in use, not all of which have clearly identified roles and many of which could possibly be deployed more effectively.

— insufficient investment.

3. Policy options. The options available to policy makers and transport operators fall broadly into one of three categories:

— financial

— technical

— institutional

There is much interaction between all three, but they are discussed individually below.

3.1 Financial policy options. Local and/or central government often control public transport fares and to a lesser extent service levels (for example, route allocation) directly. Costs may be influenced directly, through, for example, tax policy (both as it affects input prices and as levied on operational output) and indirectly via the effects of industrial and safety legislation on manning levels, minimum wage rates, vehicle up-keep, etc. Productivity, and hence costs, can also be directly influenced by traffic management measures which result in improved vehicle output.

There is some evidence from operators of buses in the nationalised urban public transport sector in India that the cost increases they have experienced over the last ten years are totally attributable to increases in input prices: i.e. there has been no change in productivity over that period. Though productivity has not deteriorated in absolute terms the corporate sector rarely bears comparison with private, small-fleet operators of similar vehicles, being used in similar conditions. For example, in Delhi the difference in costs per unit of output is as much as 20 per cent in favour of the private operator.

This difference may largely be accounted for by labour practices, the larger companies, which are more in the public eye, being constrained by labour and safety legislation controlling driver hours and vehicle standards. Interestingly, there are also cost differences within the nationalised sector between large and small fleet operators operating similar vehicles but in different operating conditions, i.e. large and small cities. The largest fleet operators in India, operating in the large metropolitan cities of more than 1 million

population, have costs per vehicle km some 30 per cent (and more) higher than the smaller fleet, used in correspondingly smaller cities. (To put this in some perspective the largest operator has a fleet size about 70 times greater than the smallest). In the western world these differences might be ascribed to the lower productivity of vehicles in bigger cities due to more congestion (Webster, 1983) and perhaps greater problems of staff recruitment experienced in these conditions. (It is generally accepted that there are few economies or diseconomies of scale within the bus industry). However, in India vehicle productivity in urban conditions is generally highest in larger cities being typically 200-220 kms per vehicle-day as against 170-200 kms per vehicle-day in smaller cities. A closer examination of the cost components which contribute most to the difference in total costs indicates that capital costs are primarily responsible; the large companies pay significantly more in interest and depreciation payments, per unit of output. (The reasons for this are not clear from available data, but could be attributable to differences in investment policy — for example, encouraging more modern fleets in larger cities — or, in some cases, results from the cumulative effects of deficit financing, itself the effect of low fares). Expenditure per unit of output on other cost items like manpower, fuel and spares is largely uninfluenced by fleet size.

Labour productivity could undoubtedly be improved within the nationalised sector following trends adopted in the western world such as, for example, one-man-operation of buses. However, the associated need for expensive, special technologies (eg automatic doors) may make such an exercise prohibitive. Furthermore, buses in the Third World are much more highly loaded, with average load factors between 70 and 80 per cent, compared with 20 to 30 per cent in the UK, making the drivers' task more onerous. Neither is there the same pressure on labour costs, where typically only 40 per cent of costs are attributable to this source as against 70 per cent in the UK.

The argument over differences in costs between private and nationalised operators is often confused with other arguments about the optimum size of firm and optimum size of bus. In general smaller vehicles will be more expensive to run per seat kilometre, all other things being equal. But they may well be more profitable than large buses to operate, even with similar fare structures; fare

leakage is less, fare concessions are fewer and the service can be more easily tailored to fluctuations in demand (both spatially and temporally) to achieve consistently high load factors. It is unlikely, however, that minibuses are, as is sometimes implied, the panacea to urban transport problems. They have a role to play, but the demands of high density commuter movements require a high capacity transport system which does not have the external congestion costs that a large fleet of minibuses might incur.

In general vehicle output in the Third World is very high, with vehicles being run continually throughout the day. Annual output may be of the order of 60,000 km as against 45,000 for a bus used in urban conditions in the developed world. Bus priority measures do not guarantee improvements in vehicle productivity, the time savings having to be quite substantial before more trips can be undertaken or fewer buses employed. The main benefit may be a more reliable and speedy service, with perhaps tighter headways. Where significant changes in overall bus speeds result, the fuel consumption may be improved — for example, if bus speeds in Delhi could be improved overall by 10 per cent then bus operating costs would be reduced by about 1 or 2 percent, fuel being a major cost component (as much as 20 or 30 per cent of total costs) in Third World urban bus operations.

Another way of improving vehicle productivity is to provide express or limited-stop services, though this may be at the expense of passenger throughput. An express bus service in use in Hyderabad was achieving 10 per cent greater vehicle output than ordinary stage services, but was grossing 20 per cent less revenue. (Maunder and Fouracre, 1983). This example highlights one important area where there is vast scope for improvement in bus operations: planning and management support services. Resources could be used more effectively through closer monitoring of route, depot and workshop performance. Cost-benefit techniques could be used to demonstrate the net worth of alternative development strategies including the benefit derived from subsidies.

The oft-heard cry of operators both in the private and nationalised sectors is that fare levels are not kept in line with increasing costs. In India there is some evidence from the nationalised sector, which keeps better records, to support this. For example, bus fare levels in Delhi in 1981 were

some 30 per cent lower in real terms than they had been seven years earlier. Private operators of IPT may be able to resolve the problem on an unilateral (though illegal) basis by bargaining their services and rates with users prior to a journey. Even so, from time to time there are open confrontations between these operators, usually acting through their trade associations, and local government on the level of fares.

The implicit justification for the control of fares is that the urban poor, who form a substantial part of public transport demand, are a captive market and they do not have the resources to pay the full cost of their travel. It is also often levelled against operators that the real pressure on fares comes from declining productivity standards, rather than rising input prices, and that they should rationalise their operations before demanding fare increases. As noted earlier, such accusations may not be fair.

A cheap fares policy can be regressive in that large numbers of travellers who benefit could well afford to pay more for travel. The growth in charter bus operations, which has taken place in cities like Delhi, is largely accounted for by users of stage buses who have been prepared to pay more for the higher quality service provided by the charter bus. A policy of more selective relief for the urban poor, whilst desirable, would probably be extremely difficult to administer. Some of the concessionary travel which public transport operators provide (and the costs of which they bear) is anomalous. In many instances students are able to travel at absurdly cheap rates. Revenues 'lost' on these concessions should be recognised openly as a form of subsidy and reimbursed by local government, particularly where students are travelling during peak periods.

Services and fares might profitably be geared more closely to different sectors of the market: in many instances the role of IPT can be seen in this light, providing a higher quality service at higher rates. Some corporate sector operators have introduced parallel high quality services at premium fares, but, for a variety of reasons, not always with much financial success. (Maunder and Fouracre, 1983). This again points to a much greater emphasis on service planning based on proper market research techniques.

One problem of fragmenting the market in this way is the loss of network advantage - the ease of interchange between routes and services is much

reduced. How important this is clearly depends on many factors, but it is likely to be felt more in larger cities which may involve more complex travel patterns.

3.2 Technical policy options. Technological change is continually being directed towards an improvement in vehicle performance and/or a reduction in operating costs. The auto-rickshaw of S. E. Asia can be seen as the logical development of the more traditional cycle and hand-rickshaws, which it may well replace completely in years to come.

There will be little pressure, as noted earlier, to introduce technology which improves labour productivity. Apart from the abundance of cheap labour and the need to provide employment, the more advanced technologies required need expensive skilled maintenance labour and facilities. Also it must be accepted that driver skills in the Third World leave much to be desired, and that the greater capital investment would be exposed to the same high level of accident risk as is the much cheaper equipment in current use.

Perhaps the major debate concerning technical advance in public transport in larger Third World cities is about how best to provide for high volume passenger movement on major corridors, at minimum cost. A few cities in LDRs have metros - notably Mexico City, Sao Paulo, Rio de Janeiro and Peking - while several other cities (eg Cairo, Calcutta and Baghdad) are currently investing in heavy mass transit systems and many others are discussing the possibility. Yet others (eg Tunis) are considering Light Rapid Transit (LRT) or trolley bus systems (eg Delhi).

Metros cost two to three times as much as an LRT to build (£20 to £40 million per km) and can be slow to construct, particularly in central areas where extensive tunnelling is necessary. On operational costs they can compete with existing bus systems and LRT only at very high loadings. If user and non-user costs (ie economic costs) are included in the comparison then metros are likely to be far more cost-effective in relation to LRT and existing bus schemes, particularly in very congested areas. What is not often appreciated, however, is the extent to which capacity could be increased for an existing bus system. Reserved lanes (eg Bangkok), segregated tracks (eg Curitiba) and operational improvements (eg the Common system of bus convoys in Sao Paulo) are

all techniques which can be used to increase effective passenger throughput on buses. In Bangkok the bus lanes are achieving loadings of 250 conventional buses per hour, together with as many as 100 minibuses per hour (Marler, 1982). Total passenger loadings could, therefore be well in excess of 20,000 per lane hour, which is well within the range of figures usually quoted for metros of between 10-40,000 per track hour. (Lehner, 1975).

The reasons why cities have opted for the high-cost metro are not entirely clear. It may be that planners have been persuaded that the metro is the only technical solution to moving large volumes of people quickly and effectively. It may also be that economic considerations outweigh financial implications, though if this is the case it is unfortunate for the operators that the economic arguments get forgotten when the need arises for subsidies to keep the system functioning. And undoubtedly subsidies will be required, because to charge financially based fares would divorce the metro system from its obvious role of catering to mass-movements of low-income wage earners. (It is estimated that the cost per place km on metros in Third World cities could be as much as 80 per cent higher than on buses). Both Bangkok and Singapore have witnessed much contentious debate about the relative merits of a bus system or a metro, with the latter currently in greatest favour.

Energy considerations may have some influence on the direction of public transport developments. For example, the availability of cheap, hydro-generated electricity may make a trolley-bus system an attractive alternative to diesel-powered buses. In national terms, the savings in energy imports are likely to be small. Even so, it is well to remember that despite the current depressed state of the oil market many observers predict continuing long term price rises in petroleum products.

3.3 Institutional policy changes. There are perhaps two key issues of institutional policy. One concerns the extent to which the public transport sector should be controlled by local government and whether fewer restrictions would promote a more efficient and effective service. The other issue concerns the extent to which demand can be managed, through institutional techniques, in order to reduce the burden on supply.

On the question of regulatory policy, most authorities would agree the need for quality licensing, but few would agree about the need for

quantity licensing. The debate seems intractable with no clear evidence for either the need or otherwise; more often than not the debate becomes highly politicised, and perhaps the pragmatic approach would be to accept that local politics will be the main arbiter of what system will be adopted. However, it is worth making a few points. There is no guarantee that de-regulation opens up the market to all-comers. Very often, trade associations or cartels (of owners or drivers) take up the role of regulation, so as to avoid the risks of cut-throat competition. There is no certainty that such cartels would show any sense of responsibility towards community needs, nor, indeed, would they be accountable in any way to the community.

De-regulation is often seen as a means of introducing a greater sense of commercialisation into existing nationalised operators and recent experience from the UK tends to confirm that this can happen. There has been a positive reaction on the part of nationalised operators to the threat from greater competition with a move to introduce better services at more competitive prices and with more comprehensive marketing. The inadequacy of management support facilities in Third World operations (noted earlier) might hinder such positive response there. This should not be seen as an argument against de-regulation, rather that this particular objective of the policy might not be fulfilled in these conditions.

One suggestion that is receiving increasing attention and seems to have some merit, is for local authorities to specify the public transport service they require, for which tenders are then requested from prospective operators. This so-called "supply-side" competition (Quarmby, 1984) would allow operators to concentrate solely on providing their services cost-effectively (to meet the specification), leaving the problems of how to specify services (including social and unremunerative) to local government who would hopefully reflect community needs.

Demand management is the policy option which is open to local authorities largely as a result of their control over land-use development. Other instruments, like the staggering of office hours may have marginal effects on congestion levels; perhaps of more relevance is the segregation of school and office hours so that students are not travelling during peak hours.

The interaction between city and transport development is by no means clearly understood. The effects are two-way and probably of a long-term nature. The provision of cheap public transport or large investments in transport infrastructure may be just as significant to structural change in the city as planned land-use development. The latter may, itself, depend critically on co-ordination with transport developments for its success. In too many cases transport has been developed in an inefficient way in order to solve accessibility problems created by unilateral developments in land-use; for example, the development of "residential township" (usually for the urban poor) isolated from employment opportunities and other amenities. Even so, it would be wrong to assume that an integrated approach to land-use and transport development will solve all such problems. Siting industry and workers in close proximity, for instance, may reduce transport demands in the short-term; as time goes on, however the travel patterns of individual households will change, for a variety of reasons, and particularly so in larger cities where other employment opportunities exist and where the structure of industry and the urban economy may be changing quite rapidly. This would militate against making investments in "fixed" systems like metros. It seems inevitable however that there will be a continuing need to provide for the large-scale transport of commuters along recognised corridors during limited periods of the day. The pragmatic approach might be to recognise this fact and to develop along these corridors, providing industrial and employment opportunities along their length.

4. **Concluding remarks.** Having reviewed some of the policy options available, it must be said that there can be no single approach to transport development which can or should be adopted. Transport policies obviously have to be planned in the light of local city development objectives, operating circumstances and available resources. It is quite evident that different cities have approached the problem of providing for transport demand in different ways and there is some evidence of a broad correlation between certain characteristics of the city and its transport system. However, the mechanism of interaction between the two needs much greater understanding, if only to avoid the (frequently) inevitable result of creating the long-term problems through solving immediate transport demand problems.

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