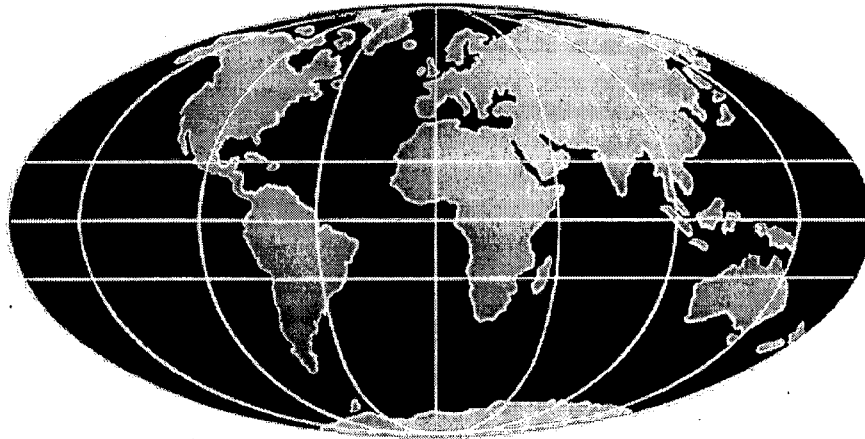


**TITLE: Taking the Bus Industry into
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TAKING THE BUS INDUSTRY INTO THE 21ST CENTURY

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ABSTRACT

With increasing problems of urban traffic congestion and pollution, and the great dependence on over-burdened public transport for access and mobility, many developing city authorities are searching for cost-effective ways of providing adequate travel facilities for their citizens. The conventional bus, used for operating stage-carriage services, has been the mainstay of travel in many cities, but as a generalisation, its future is blighted by under-funding, performance and cost inefficiencies, and fierce competition from the para-transit sector. Against this background, this paper examines the current status and role of the bus industry, and the case for supporting its development into the 21st century. Reference is made to international experience on the outcome of development options in the public transport sector which have been tried.

1. INTRODUCTION

In his Smeed Memorial Lecture in 1981, Bayliss confidently predicted that by the end of the century *'the bus will become an even more important carrier in large cities mainly because of the high growth rate of these cities in less developed countries where neither expansion of car ownership or rail facilities will be able to keep pace with the expected growth in demand.'* As we reach that point of his forecast, there seems little to discredit that prediction. Road-based public transport, in its various forms, continues to be the main carrier; suburban rail systems are important in only a handful of developing cities (for example, Bombay and Calcutta), and metros (of which some twenty have been built in developing cities over the last two or three decades) may contribute significantly along their corridors of operation, but not necessarily on a city-wide basis. In the developing world, only the Mexico City and Sao Paulo metro systems carry more than one million passengers per day, but even these high loadings represents only about 10 per cent of all public transport trips undertaken daily.

This paper starts from the premise that road-based public transport will continue to make a strong contribution to urban transport in the developing world well into the 21st century. But what new challenges will the public transport industry face, how will it approach these, and what support will it need?

2. THE CHALLENGES

2.1 Urban growth.

There has been considerable growth in world population over the last few decades. Between 1960 and 1994 it grew from approximately 3 billion to 5.6 billion. The projected world population for the year 2015 is 7.3 billion which represents a growth of 143 per cent over the 1960 figure (DFID 1997). Within developing countries growth is taking place in cities as a result of both natural population growth and rural-to-urban migration. The World Bank (1996) suggest that urban populations in some developing countries are growing at more than 6 per cent per annum, and more generally at 3-4% per annum. It has been predicted that growth will continue at these high levels so that by 2025 there will be 625 cities with more than 1 million population, and as many as 144 cities having populations in excess of 4 million. Well over three-quarters of these cities are in the developing world.

This background on population serves to show that urban areas contain a significant proportion (which could be as high as 50% by 2000) of the world's population. For cities to function well and serve the population there needs to be an effective and efficient and accessible transport infrastructure as *'transport is central to development. Without physical access to jobs, health, education and other amenities, the quality of life suffers; without physical access to resources and markets, growth stagnates, and poverty reduction cannot be sustained. Inappropriately designed transport strategies and programmes, however, can result in networks and services that aggravate the condition of the poor, harm the environment, ignore the changing needs of users, and exceed the capacity of public finances'* (World Bank 1996).

Urban growth is accompanied by increased aggregate travel demand, as well as a shift towards vehicular modes of transport. The latter naturally occurs as urban trip distances increase in length, as a result of which walking and other non-motorised travel modes become less convenient. Already in Colombo, the five main arterials and the railway are catering for over 0.8 million person trips per day entering the city, and the vast majority of these are undertaken by some form of public transport. (Kumarage, 1997, cited in CIT, 1998). Growth in this traffic has been at the rate of 5.4% per annum over the period 1979-92.

At the same time private car ownership in Colombo has been rapidly increasing. Between 1992 and 1996 the vehicle population has been growing at about 5% per annum, which is well in excess of population growth, indicating that access to vehicle use is on the increase. Given continued real growth in the economy, there is every reason to suppose that growth in per capita vehicle ownership will continue to increase (Ellis, 1994). This growth is reflected in congested roads, particularly in the central parts of the cities (Central Business Districts). Road improvements and traffic management can address this problem, but only temporarily if vehicle ownership increases unabated, since road capacities cannot be expanded at the rate of vehicle growth due to such limitations as availability of land space and funds.

Apart from the congestion effects of the increase in vehicle ownership, parking of vehicles will become an increasing burden which will have to be addressed if the roads are to be kept free for

circulation of traffic.

2.2 Urban structure

A feature of many cities which has an important impact on travel is urban structure. The mono-centric urban form of many cities puts strong emphasis on radial movements towards the city centre. This has a positive outcome in that public transport can be relatively easily organised, focussing on the high demand radial corridors which are created. However, the concentration of movements on a small destination area, and during limited time periods (morning and evening peaks), contributes greatly to the congestion problems on the roads.

Locational aspects are very important in mode choice. Commuters come to rely on public transport for journeys in excess of about 10 km. This characteristic is particularly marked in low-income groups who have few travel options. Where high income commuters do travel long distances, they usually have access to faster modes than public transport and will accomplish their journeys speedily.

2.3 Finance

Investment in urban public transport has a recent history of high financial risk, and a strong likelihood of loss-making. Operating conditions within the urban environment restrict the possibility of high vehicle output, and the level of fares are equally restricted (usually for political reasons), which is likely to be reflected in inadequate investment. Where private capital is invested, risk is minimised by focussing on high demand routes, and contracted routes and services (where local authorities guarantee a subsidy), and also by avoiding or neglecting weak markets (which might well include the urban poor communities). Private entrepreneurs will also be attracted where capital investment is minimal (the price of an old saloon car, say) and operating costs can be contained by using very cheap and sometimes untrained labour, as for example in setting up the many paratransit services on offer.

Funding transport development in cities has always been difficult, and will not get any easier. Under the current climate of 'the user-pays principle' or cost recovery, there are no grounds for optimism that transport will improve without new approaches to sourcing finance. Apart from this there is also the basic problem of operating a viable service, which is inexpensive but affordable, in current urban traffic conditions. In many cities, the current public road transport system is dominated by cheap, small capacity, poorly maintained and frequently unsafe vehicles.

2.4 Society needs

Changes in societal norms will also impact on travel. The increasing participation of women in the workforce (generating more employment trips) and the breakdown of the extended family system (creating more households, and hence a wider transport market) are just two examples of how such changes will feed through to transport demand.

It is likely that society will become increasingly concerned about issues which may play little part

in current transport planning. For example, there is likely to be an increased awareness of the need for good environmental standards, including limits on traffic pollution and noise levels, higher road safety standards, and limits on the intrusiveness of roads, particularly in residential areas.

There will also be increasing concern about the less advantaged members of society who do not have easy access to private motorised transport, and in some cases do not have access to public transport. These groups include the handicapped, women, children, the elderly and the poor.

2.5 Technological changes

In spite of the expected advancement in science and technology, transport technologies will remain broadly similar, though with improved comfort levels, better reliability and efficiency, as well as with more attention to emission controls and safety features. Energy efficiency will also be at the forefront of technical advance, and the use of alternative cleaner fuels like LPG and electricity may well be high on the agenda.

There will be substantial changes in the way that travel charges like tolls, parking fees, fares, fines, etc., can be collected using smart cards and other pre-paid systems, perhaps linked to Ground Position Systems and Geographical Information Systems. This will make concepts like road pricing and through-ticketing more attractive to both operators and users. Enforcement of traffic offences should also be aided by the computer revolution supported by developments in communications which will allow access from the roadside to central databases. Traffic control technology will also advance offering highly flexible control strategies, driver information systems and remote monitoring.

There is also scope for transport-telecommunication substitution though the development and ready availability of improved communications and computing facilities. This could have a significant impact on the need to travel, though it has yet to be demonstrated conclusively what the nature of this relationship is. (These developments could also have a trans-national effect. One interesting, and perhaps unwelcome possibility is that the transfer of data processing to lower cost facilities in the developing world could be accompanied by a transfer in urban congestion.) Though the providers of transportation infrastructure and services, namely transportation planners, engineers, and policy makers, have little control over these technological developments, they should be aware that their impact could be dramatic.

3 THE PUBLIC TRANSPORT INDUSTRY

Public transport is characterised in developing cities by the wide range of vehicle types in use (from rickshaws to metros) and services offered. Despite the variety of vehicle types, including paratransit (such as jeepneys, tro-tros, rickshaws, tongas, autotongas, and phut-phuts), it is clear that most are employed in one of two main ways: either providing a bus-like service with fixed routes and fares (for given trips) or a taxi-like service where the route is determined by the hirer of the vehicle and the charge for the hire is metered or bargained. One important variation common in many cities is the shared taxi in which the first occupant determines the destination

and other passengers, heading in the same general direction, are picked up 'en route', each passenger paying a fixed fare.

Bus transportation in developing cities has long been plagued with a reputation (not always justified) for poor productivity, long journey times and excessive over-loading. A common policy where the urban public transport system is publicly owned, is to maintain artificially low fares, as a means of supporting the urban poor. This may be achieved in some cases by cross-subsidy from more profitable routes, or more likely, and more directly, from government (local or central) sources as a blanket subsidy. However, it is low fares that may help generate the problems of overcrowding, loss of revenue from better-off passengers (for whom the subsidy was not intended) and lack of vehicle replacement, because of insufficient investment provision. (The bus operator's problems may be further compounded where the subsidy is treated as debt on which interest is charged, and accumulates year by year imposing a heavy burden on finances.)

By-and-large, it is now generally agreed (though some still dissent) that publicly-owned transport operators are likely to be less efficient than those in the private sector, and there has been a world-wide movement towards privatising such concerns. However, there is little evidence from the developing world as to outcome of such moves, particularly the impact on the urban poor. In the UK, the experience of privatisation seems to have been mixed, with large cost savings and increased bus kilometrage off-set by lower patronage and higher fares (Bayliss, 1997, Fairhurst and Edwards, 1996, Mackie et al, 1995). Of perhaps even more interest has been the gradual emergence, through merger and predatory acquisition, of a few major bus companies, which raises questions about the competitive outcome of privatisation in the UK. It might well be noted that privately-run concerns are equally prone to corruption, monopolistic practice (and resulting inefficiency), and to generally bad operating practice which is not in the users' interests.

The outcome of these developments has often been the proliferation of the paratransit sector, based on low-investment (i.e. small and sometimes aged vehicles), limited networking, and inadequate user facilities. There is considerable discussion (e.g. White, 1990), with no clear consensus view, as to whether the external costs (like congestion and pollution) of these smaller vehicles are off-set by the benefits of the service they provide.

As regards rail-based public transport, it is apparent that in most developing cities suburban rail (where it exists) plays only a small role in urban transport. In some cases this is because the rail alignment does not meet commuting patterns, and in other cases because of chronic under-funding of the rail system (which may have come about at a national level, or because the rail company is reluctant to enter the urban market), which has resulted in poor reliability. Metro schemes, which are both technologically and institutionally new, are likely to be more reliable, and can provide for very high levels of passenger movement. However, they too suffer from unsound financing; while they may be economically justified, very few have covered their operating costs, let alone depreciation and sunk capital costs. Trams and Light Rapid Transit schemes are cheaper to construct, but lack mass-transit capacity.

There can be little doubt that cities will continue to grow in the future, that travel demand will similarly grow, and that road-based public transport is going to remain the work-horse and back-

bone of the transport system. But given the challenges they face, bus operators are going to need some support, encouragement and guidance, so that they may fulfil their role effectively and efficiently.

4 SUPPORTING THE BUS INDUSTRY

4.1 Public transport deregulation and liberalisation

Many authorities have suggested that tight regulatory control of the public transport sector restricts competition and choice. These measures, which may specify market entry qualifications, route allocation, and prescribed fare levels, are often imposed to protect a publicly-owned incumbent. The resulting monopoly service is likely to be inefficient and financially unsound.

However, even under a liberal regime, some form of regulation may still be helpful. White (1990), for example, has suggested that co-ordination of public transport policy in relation to the formal and informal modes is necessary. He observed that the formal modes (i.e. stage carriage services, usually operated by large capacity vehicles) are best suited to trunk radial routes, and other relatively high density flows, while smaller vehicles (minibuses and paratransit) are better suited to less demand dense routes. This means that better use is made of large vehicles, and also the congestion caused by a large number of small vehicles on busy main routes is reduced. Simon (1996) also noted that minibuses are particularly suited to operating low volume routes, off-peak and feeder services and serving areas where roads are too narrow for conventional services.

4.2 Institutional and ownership issues

The organisational framework within which public transport is planned and functions will undoubtedly have a powerful influence on performance, though the mechanisms are not easily explicable or clear. There are many different organisational models, ranging from the centrally planned and publicly owned, to the other extreme of decentralised and individual owner-drivers. As already noted, there is a worldwide move towards private participation, but this may go hand-in-hand with fragmentation of services, particularly if private participation and liberalisation equate to opening the market to paratransit. The benefits of networking and integration, which the large operator (private or public) can bring to the market, are difficult to quantify, but should not be given away lightly in a modern big city. Where operators cannot provide these incentives to efficient travel, then local authorities should have some mechanism for intervention.

Community participation in bus operations has long been tried and tested in rural communities of the developed world. A few interesting developments along these lines are beginning to emerge in developing cities. Russell and Anjum (1998) cite the cases of Faisalabad and Lahore in Pakistan, where NGOs have become involved in the framing of regulation, and the control and monitoring of operations, *'which has provided a more open, consultative forum'*. In Cape Town, Golden Arrow Bus Services, which is the sole provider of commuter bus services in the Greater Cape Town Metropolitan Area, is part owned by the Golden Arrow Foundation, which has trustees drawn from the community. *'The Foundation has helped the company to grow from just*

the provider of bus services to a fully participating member of the community in which it operates' (Cronje, 1998).

4.3 Public transport fare subsidy

A common policy where the urban public transport system is publicly owned, is to maintain artificially low fares, as a means of supporting the urban poor. This may be achieved in some cases by cross-subsidy from more profitable routes, or more likely, and more directly, from government (local or central) sources as a blanket subsidy. However, as Parker (1983) noted, low fares can result in problems such as overcrowding, loss of revenue from better-off passengers (for whom the subsidy was not intended) and lack of vehicle replacement, because of insufficient investment provision. Parker suggested that route specific subsidy may be a better option than cross-subsidy of routes or a general blanket subsidy. Many services and routes in the UK are provided on this principle, with the local authority identifying the requirement and contracting a bus operator to meet this, either at lowest cost or lowest subsidy.

Many observers have noted that public transport subsidy can be open to abuse, and is a source for encouraging inefficiency within the bus industry. If subsidy is justified, then careful monitoring of its application needs to be undertaken to ensure that the target population is reached. Travel pass and travel token systems (Astrop et al, 1998) are operated successfully by a number of county councils in the UK, particularly for the elderly and disabled. Brazilian cities have a novel system (vale-transporte), whereby employers must, by law, buy and distribute public transport tickets to their employees. Employers can, as an alternative, provide staff transport. They can also withhold up to 6 per cent of salary to help defray the cost of purchasing the tickets.

4.4 Investment in public transport

In the past, foreign aid has been used to invest in bus fleets, but usually with limited success. The recipients have been the under-funded and inefficient public sector operators, who have been unable to capitalise on the loans. White (1990) observed that although foreign aid can play a role in improving public transport facilities, most investment will have to come from within the countries themselves. An example of this is in Singapore, where citizens can purchase shares in the bus company up to a certain limit by using money saved as part of a compulsory national saving scheme. White suggests that mixed public and private investments may be more successful in attracting capital than those exclusively in the public sector which have to compete with other public sector demands for scarce resources.

In a similar vein, mass transit investment in Seoul has been part-funded by the issue of 'subway-bonds' which any new-car buyer must purchase. In Paris, a tax on employers (based on the number of employees) is used to part fund public transport services and infrastructure. This general approach of hypothecating a travel tax or charge to public transport investment is rapidly finding favour, and it may not be too long, for example, before road-user charging in British cities is used to fund such developments.

4.5 Improving public transport output

Bus output can be significantly improved through the provision of priority measures. Possibilities include bus segregation (e.g. with and contra-flow bus lanes) and special traffic management features (e.g. bus gates and bus actuated signals). In London, these low cost approaches to transport improvement have resulted in increased bus productivity and improved service frequencies without increasing fleet size (Astrop and Balcombe 1995). The Leeds guided busway has reported significant patronage increases, and improved customer satisfaction (Quinn, 1998). These schemes do rely on good driver behaviour, with the back-up of strong monitoring and enforcement to be certain of success.

Busway transit has also been used in a number of developing cities. Busway transit is essentially a bus lane which is physically segregated from other traffic by kerbs, fences, traffic islands etc. This reduces the need for enforcement, and substantially increases bus performance. Busway performance is equal to that of most LRT systems and many metros (Gardner et al, 1991).

A recent development in the UK in support of these and other measures to improve output and performance has been the establishment of 'Quality Partnerships' between operator and local authority. At present these are non-legally binding agreements which set out the conditions to which the two parties are committed with the aim of improving bus service performance. For example, the local authority agrees to provide a bus gate and its ancillary traffic management, while the operator agrees to provide a certain level or quality of service. The nature of these agreements is still being developed, and is subject to local variation. 'Quality Partnerships' raise many issues (e.g. rights of competition and penalties for non-compliance), but central government is now taking an interest and looking at the possibility of introducing legislation to give legal status to such agreements.

4.7 Land-use development and the role of public transport

There is a continuing debate as to the preferred nature of urban development and also the contribution that transport development can make in this context. Naude and Crous (1998), for example, identify the protagonists as the 'new urbanists' (*'mainly land-use planners, who advocate a compact city structure, with transit-oriented development, mixed use activity centres and corridors, travel demand management and a better match between people and jobs in all areas'*) and pragmatists (mainly transport planners *'who are generally more sceptical, not about motivations for these policies, but rather about the possibility of implementing them at a sufficient rate and scale in order to have a meaningful impact'*). That transport planners are perhaps more realistic may be gauged by the fact that there have been very few successful examples of transport being used in harmony with urban development. One such is that of Curitiba in Brazil (Fouracre, 1975, Rabinovitch and Leitman, 1996), with its high density development spines built around public transport corridors. It seems to have worked because it was conceived at an opportune time when the responsible person (an urban architect) not only had the vision, but also the political power and support to implement his plan in its totality.

The role of public transport is a key component of any debate about new town development or

the restructuring of existing cities. Cape Town, for example, is developing an integrated Metropolitan Spatial Development Framework (MSDF), which sees as one key plank the intensification of development at selected commercial and residential activity nodes and along connecting activity corridors which support public transport development (Naude and Crous, 1998). In efforts to integrate the black communities and encourage commercial development, both Bulawayo and Harare, in Zimbabwe, are supporting the development of out-of-town shopping malls close to the black townships. These have also been identified as public transport nodes, and appropriate facilities provided.

This use of public transport as a facilitator in the development process has a long history, but is still finding fresh application in approaches like the Dutch inspired ABC location policy, the UK Planning Policy Guidance Note 13 and the American Transit Oriented Development.

5 CONCLUSIONS

Developing cities present a range of development characteristics, dynamic growth patterns, transport infrastructure and operations, and social customs which defy all but the broadest generalisations. Even so, it is important to try to understand the processes and interactions which drive transport demand if transport planners are to contribute positively to the general debate about urban development.

As cities become larger travel demand grows at a disproportionately higher rate and there is a greater dependence on public transport for travel needs, particularly (but not exclusively) from the urban poor. It is also evident that trip movements become focused on corridor travel feeding into the city centre; once a city reaches a population of about 2-3 million, corridor flows will reach around 20,000 passengers per hour per peak direction. Corridors and city centres which have to handle this level of demand are prone to endemic and prolonged traffic congestion, because of the inadequate capacity of the infrastructure to meet both private and public vehicular demands. Public transport, potentially the most efficient carrier and that which serves the majority of travellers, cannot deliver an effective service in these conditions; journey times and waiting times are long, irregular and unreliable. And because of the poor productivity of buses, together with a low revenue earning potential, the financial position of operators is often weak. In these circumstances the prospect for improved public transport services is grim; operators cannot afford new investment when they cannot even afford the depreciation on existing stock.

From the traveller's viewpoint the main concerns are reasonable access to activities in reasonable time and comfort, and at an affordable cost. Even in the short term transport planners and operators are struggling to achieve some semblance of satisfying these needs. In doing so they face mounting costs as central area access and congestion problems worsen with increasing city size.

Within this framework, it is clear that road-based public transport will continue to bear the brunt of urban travel requirements well into the future. There are ample reasons for supporting urban public transport in meeting these needs, based on efficiency in road space use, energy, and

environmental considerations. Indeed, it will need the strong support of government if it is to meet these needs: fair regulation and strict enforcement within a liberalised operating regime, provision of priority measures and roadside bus facilities, access to investment funds, and targeted subsidies or competitive bidding for subsidised services are some of the measures which may be pursued. In return, the bus industry must be accountable for meeting its obligations and providing adequate levels of service which are reliable, comfortable energy efficient and pollution-free. The formalisation of such arrangements through 'Quality Partnership' may provide a basis for stronger and more positive collaboration between regulators and providers which addresses the real problems of the travelling public.

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