

THE INFLUENCE OF PUBLIC TRANSPORT ON SPATIAL DEVELOPMENT IN METROPOLITAN CAPE TOWN: PAST, PRESENT AND FUTURE

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INTRODUCTION

The planning, management and operation of public transport in South Africa is currently undergoing fundamental transformation. Driven by National Department of Transport (NDoT) policy initiatives, transport authorities in urban and rural areas will for the first time ever be required to plan for *and implement* integrated, efficient, user responsive public transport systems aligned with spatial development objectives. The evolution of the public transport system on the growth of the Cape Metropolitan Area (CMA) are reviewed from a strategic perspective, taking into account policy initiatives and their implications as well as juxtaposing other trends which may well challenge policy doctrines.

THE INFLUENCE OF PUBLIC TRANSPORT UP TO THE CURRENT TIME

From its earliest days Cape Town's spatial development has been significantly influenced by the provision of public transport. Up to the 1920s spatial development of the Cape Metropolitan Area (CMA) can be characterised by 3 broad trends:

- Slow rate of growth, due to relative low population growth
- "Ecological" growth in the sense that it was essentially unplanned
- A linear pattern of development because development was related to and controlled by through roads along which public transport services connected the different parts of the city, later reinforced by railway lines.

From the 1920s to the 1950s the spatial development of the CMA was dominated by the following trends:

- A rapid increase in population growth, particularly among the poor.
- Comprehensive planning and introduction of mass building techniques to speed up development delivery to meet population growth.
- The advent of the motor car.

The consequences of these factors were:

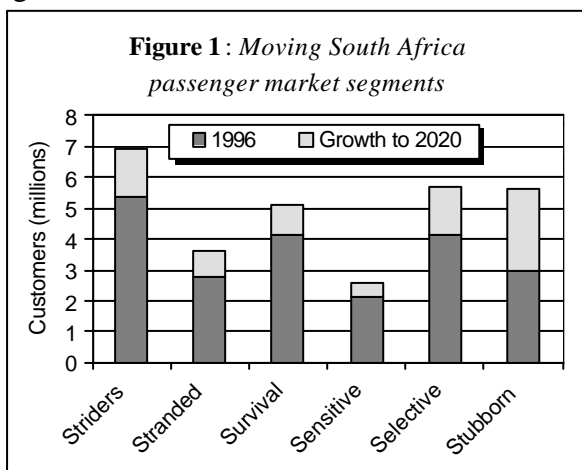
- The solution of the housing problem was equated with providing the greatest number of low cost houses possible, which meant that large tracts of open land were sought.
- A loosening up of the linear pattern of development since the motor car meant that developments were no longer tied to fixed line public transport systems.

Increasingly development moved out from the initial settlement and infilling between the “ecologically” developed linear arms began, particularly between the northern and southern arms on the area known as the “Cape Flats”.

From the 1950s to the 1990’s the provision of public transport in the CMA (as in the rest of South Africa) has been the product, as well as instrument of, past apartheid settlement strategies that located townships on the extreme peripheries of cities. Rail and bus infrastructure were developed to link these distant residential areas with more established employment centres and the operating costs of these modes were heavily subsidised to enable workers to be transported over long distances at low fares, other mobility needs being largely ignored. Since the late 1970s, the minibus-taxi industry rapidly grew as a primarily informal response to the inability of heavily subsidised and protected rail and bus services to effectively meet user needs. The minibus-taxi industry has however, become increasingly mired in conflict due to destructive competition within the industry itself as well as with heavily subsidised bus and rail modes.

Since the demise of apartheid to the present day, various trends are exacerbating these problems and threatening to entrench the status quo:

- extensive new low cost housing projects are being located on “greenfield sites” on the edge of cities far from established employment and commercial centres
- commercial and industrial development is moving out of established centres and creating a widely dispersed distribution of employment areas which are difficult to serve by public transport
- bus and rail services are still essentially commuter based with few off peak services to meet the mobility needs of shoppers, students, the elderly, tourists and the unemployed.
- operating subsidies are rapidly increasing despite declining passenger numbers – nationally only 40 per cent of those users who are captive to public transport have access to subsidised services
- there is great uncertainty about the funding of public transport, even as far as infrastructure maintenance and rolling stock replacement is concerned
- regulation and enforcement of the minibus-taxi industry remains haphazard and weak
- more and more choice users are switching to private cars for their daily transport needs
- institutional and management structures are still fragmented with no one authority able to plan, raise funds for, implement and enforce an integrated transport system at the metropolitan level of government



These factors have combined to result in public transport in South Africa having become a poor person’s, “one size fits all” utility. The response of NDoT has been to prepare a set of strategies collectively entitled “*Moving South Africa – the Action Agenda*” (MSA). These ambitious strategies firmly place meeting customer needs as a key objective. To identify and scope customer needs, MSA identified six urban passenger market segments. This analysis clearly shows that

approximately 67 per cent of all urban passengers in South Africa are captive to public transport (see Figure 1) and that that by 2020 about 62 per cent of urban passenger customers will be captive to public transport if current trends continue. This means that as a first policy priority, public transport resources, such as subsidies should be allocated to meet the full range of mobility needs of lower income users who are captive to public transport. A second objective should be to ensure that as income levels rise over time, these users find public transport an attractive alternative to car travel.

MSA is centred on the successful implementation of the following key actions:

- halting further dispersion of land use development
- effectively regulating all public transport providers in terms of integrated transport plans (ITPs)
- empowering customers to demand better services
- planning to replace dispersed route networks with high-volume, all-day corridor operations over those parts of the network where greatest current and potential demand exists
- serving these corridors by feeder services and integrating them through multimodal interchanges
- identifying the mode that can best meet customer needs at the least cost for each corridor and regulating optimal modes by performance based contracts in the case of road-based modes and concessioning in the case of rail services
- integrating transport plans with urban land use planning to ensure that public transport corridors reinforce high density mixed land use corridors and become an important instrument to reintegrate urban areas
- encouraging alternative, unsubsidised, services for more demanding customers where they do not undermine the volumes required for a sustainable optimal mode in a corridor
- implementing tough road space management measures to restrict the unnecessary use of cars where public transport is developed sufficiently to be an attractive alternative to choice users.

These national policy directives have been taken forward in transport planning for the different metropolitan areas.

THE URBAN TRANSPORT CONTEXT IN THE CAPE METROPOLITAN AREA

Socio economic conditions in the CMA are an essential context for the analysis of the influence of public transport on spatial development. The CMA is a typically developing urban area, with relatively few people having high incomes and the largest proportion of the population with low incomes (see Table 1). For example, 60% of African and 40% of Coloured workers earn below US\$ 1 600 (R9 600) per annum and have only standard 6 education or lower. High levels of unemployment plus the concentration of very low wages mean that a substantial proportion of the population are not only vulnerable to the hardship of severe poverty but are also largely captive to public transport for access to employment, education, health and other essential urban opportunities.

Table 1: *Key socio – economic indicators for the Cape Metropolitan Area*

Socio-economic indicator	
Area (ha)	215 900
Population (1996)	2,7m
Population growth rate p.a. (1996-1999)	3%
GGP per capita (US\$, 1998)	\$3 700
% pop. living below the poverty datum line	32%
Contribution to SA's GDP	10,6%
GGP growth rate (1997/1998)	1,3%
% unemployment (1996)	20%
% employment in the formal sector (1996)	60%
% employment in the informal sector (1996)	20%

The CMA has an economy that has grown significantly faster than and other metropolitan area during the 1990s and is the second largest contributor to the wealth of the country – the first being Gauteng by a significant margin. It is also based on a relatively diverse range of sectors with strong potential in the knowledge, information and service sectors – particularly tourism.

At the same time, there are major negative trends that reinforce social divisions and inequality and act as a substantial brake on the economy. These include:

- A decline in traditional manufacturing sectors, which are in dire need of substantial restructuring to be globally competitive.
- A public sector investment in housing which is aimed at achieving maximum delivery but imposes massive opportunity costs on transport and other sectors.
- High unemployment, which is likely to increase as manufacturing sectors decline and the major growth sectors require skilled labour and capital-intensive investment.
- A critical skills gap between the demands of the new growth sectors and the skills of the labour force. In a global economy that is becoming increasingly knowledge based, only 15% of the people between 18 and 65 have more than a matric.
- A consequence of these trends is the growth of a substantial informal economy, currently comprising some 18% of the economically active population.

Up to now the public transport system has primarily focussed on meeting the needs of those employed in the formal economy and these trends provide a huge challenge for transport to reorientate itself if it is to become an instrument for restructuring and development.

Table 2: Public transport system characteristics

<i>Attributes (1998)</i>	
Bus fleet*	±700 buses
No. of bus routes*	±800
Total length of bus routes*	21 000kms
Rail fleet	95 trainsets
Total length of rail track	443 track kms
Minibus fleet	6 700 minibuses
No. of minibus-taxi routes	300
Total length of minibus routes	6 400 kms
No. of minibus-taxi owners	3 500
Metered taxi fleet	550 sedan taxis
Mode split % private : public + walk/cycle (1995, AM peak period)	44 : 56
Car ownership / 1000 population	170

* Golden Arrow Bus Services

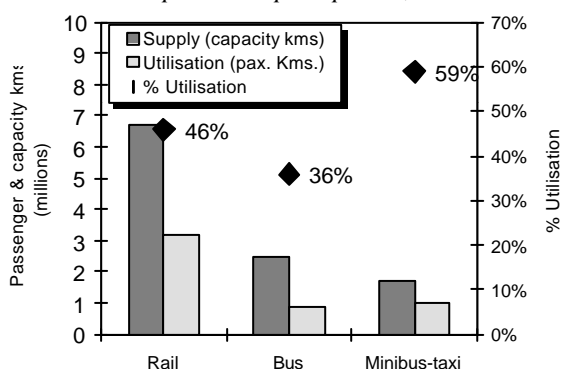
PUBLIC TRANSPORT SUPPLY AND UTILISATION IN THE CAPE METROPOLITAN AREA

To discuss the influence of public transport on spatial development, it is important to understand how the current public transport system works and to identify important trends. Public transport in the CMA is provided by 3 main modes – rail, bus and minibus-taxi. Rail and bus are scheduled services operated by single operators – Metrorail in the case of rail and Golden Arrow Bus Services (GABS). Many operators using 15 seater vehicles provide unscheduled minibus-taxi services. Table 3

summarises key attributes of the public transport system.

Rail provides the most capacity (seat kilometres and standing kilometres at an acceptable level of crowding) and has the largest market share in terms of passenger kilometres. Both supply and market share for minibus and bus modes fall a long way behind rail (see Figure 2). This is in marked contrast with other metropolitan areas where minibus-taxis have the greatest market share – nationally minibuses have 60% of the public transport commuter market.

Figure 2: Supply and utilisation of public transport - AM peak period, 1997



In the CMA minibus-taxi services are the most efficient in terms of passenger utilisation as a percentage of capacity provided. Reasons are that minibuses:

- only leave from loading ranks when they are full
- generally operate shorter routes than bus or rail
- are more flexible and are better able to serve increasingly dispersed origins and destinations than rail or bus services

For all modes, the urban structure created by apartheid settlement policies together with recent public and private investment trends, has fundamentally limited opportunities to achieve higher utilisation rates. Thus in the peak direction utilisation rates are often extremely high, resulting in dangerous levels of overcrowding, while few passengers are carried in the reverse direction. A further constraint is the bus subsidy system that has encouraged a dispersed route network.

Table 4: Current demand for public transport
(AM peak 2.5 hour period, 1998)

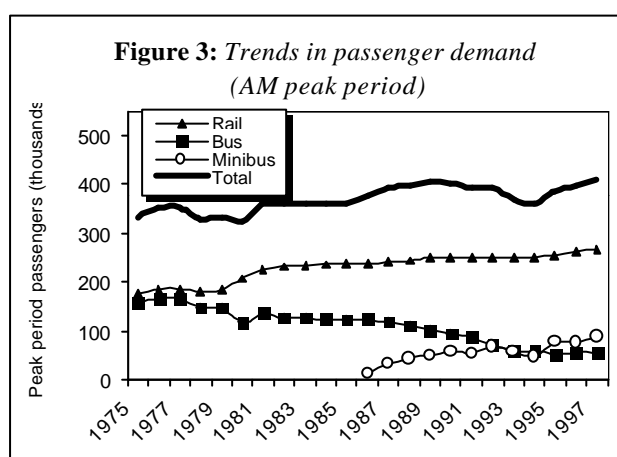
Mode	Passenger trips	% market share		Av. pass trip length (kms)
		CMA	National	
Rail	256 000	63%	12%	12.2
Bus	58 000	14%	30%	15.2
Minibus	94 000	23%	58%	10.6
TOTAL	408 000	100%	100%	12.3

DEMAND FOR PUBLIC TRANSPORT

Past and current trends

Table 4 shows some key aspects of current demand for public transport in the CMA. The dominance of rail is clearly highlighted. Surprisingly, the average unbroken passenger travel distance by bus is longer than for rail. A reason for this is that the bus subsidy system offers strong incentives to maximise route lengths. More interchanging also takes place on the rail system. Thus although unbroken passenger journeys are shorter for rail, total passenger trip lengths on the rail system are likely to be longer than by bus.

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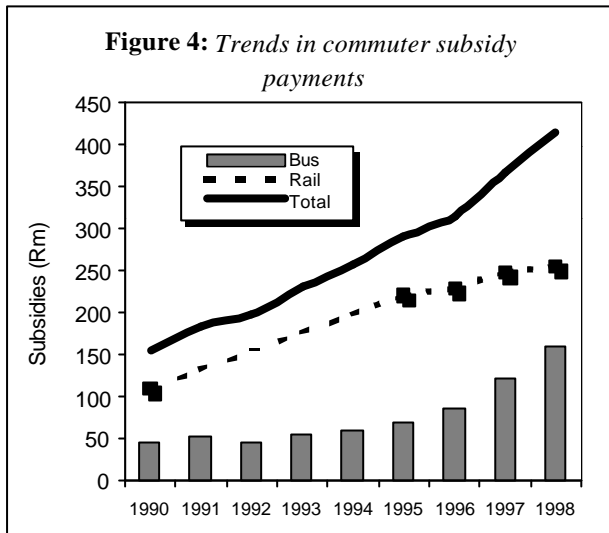


Over the last 20 years there has been a sustained decline in demand for bus services, particularly since the explosive growth in minibus-taxi market share from the 1980's (see Figure 3). Rail has maintained a steady growth in demand, its market increasingly dominated by lower income passengers while higher income train passengers are declining. Interestingly over 70% of the minibus-taxi commuter market are women. This is evidence that women are willing to pay generally higher minibus fares and risk higher accident rates, in return for faster journeys and higher levels of personal security relative to bus and rail services.

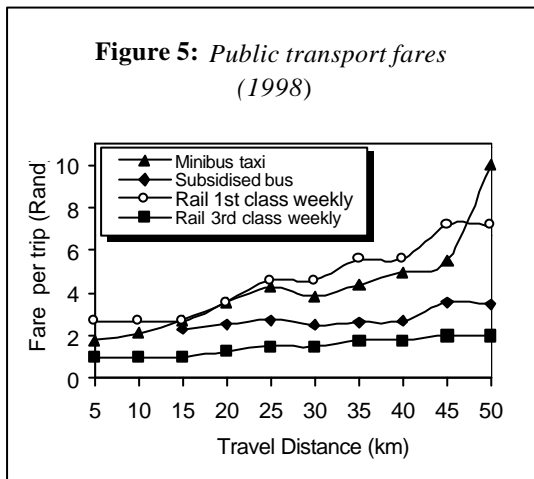
Fares and subsidies

A key factor determining public transport market share is subsidisation and the resulting fare structures. Currently only bus and rail services are directly subsidised. Significantly, Table 4 shows that 77 % of peak period passengers benefit from subsidised transport in the CMA relative to the national average of only 42 %.

Bus and rail subsidy systems are not integrated. Commuter rail services are funded by Central Government in the form of a deficit subsidy - the difference between total costs and passenger revenue. The 1998/99 annual subsidy was about R255 million. This is equivalent to R2,00 subsidy per passenger trip (12km. average), 16,3 cents per passenger kilometre or R900 per annum per commuter. During the 1995/96 financial year 44% of full operating costs were recovered from fare revenues in the CMA, compared with 31% for Johannesburg and Durban.



The NDoT also subsidises GABS by paying the difference between the full economic fare (ECF) claimed by GABS to provide a service and the amount it is believed that passengers can afford to pay for a service. Bus trips shorter than 10 kilometres do not qualify for subsidies. During 1998/99, bus subsidies amounted to R160 million - equivalent to R5,52 subsidy per passenger trip (15km. average), 36,8 cents per passenger kilometre or R3 300 per annum per commuter. The percentage subsidy varies from 27% to 77% of the ECF. For all subsidised routes, the average subsidy is 71 % of the ECF. For all services (subsidised and unsubsidised) in 1997/98 about 40% of operating costs were recovered from fare revenues.



Over recent years bus and rail subsidies have been growing at an alarming rate – particularly bus subsidies given the low market share of the bus mode (see Figure 4). There are clear indications from NDoT that such increases are unsustainable. These subsidies have a fundamental impact on passenger fare systems of the different modes. The commuter rail service issues single, return, and discounted weekly and monthly tickets for 1st and 3rd class passengers. The bus operator issues single tickets, discount-priced ten-ride clipcards and monthly tickets. Passenger subsidies apply only to discount priced tickets actually sold. Minibus-taxi fares are not subsidised and do not provide for special prices on multiple or return trips.

Table 5: Annual fare expenditures (1998)

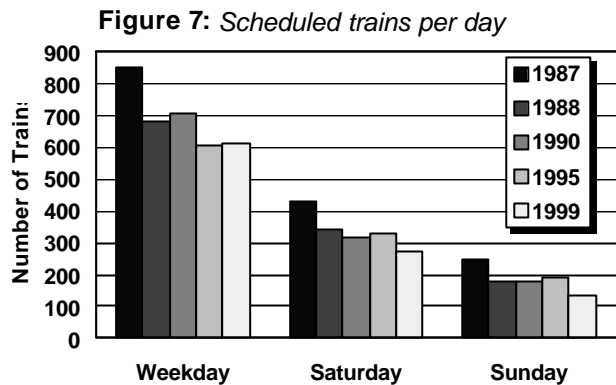
Mode	Average fare/trip (R)	Annual fare expenditure (R p.a.)	Expenditure as a % of an annual income of R9600 per annum
Rail (3 rd class)	1.50	750	8 %
Subsidised bus	2.80	1400	15 %
Minibus	2.60	1300	14 %

Because of subsidies, minibus-taxi fares are the most expensive for any given distance, and third class rail the cheapest. From a user point of view, subsidies have partially succeeded in keeping rail and bus fares affordable for the poor. As mentioned previously, 60% of African and 40% of Coloured workers earn below R9 600 per annum (US\$ 1 600 p.a.).

Table 5 shows that rail (third class) is the most affordable mode for the poor. Despite heavy subsidisation, expenditure on bus fares exceeds 10% of R9 600 p.a. It is interesting to note that the average minibus fare is cheaper than the average subsidised bus fare. A reason for this is that bus passenger trip lengths are longer than for minibus-taxis.

This analysis does not take into account the total fare costs of the journey to work for those who use more than one mode. Because there is no through ticketing system in place as yet, people have to pay more than one fare when making linked trips.

Service reductions and financial cutbacks in the rail services

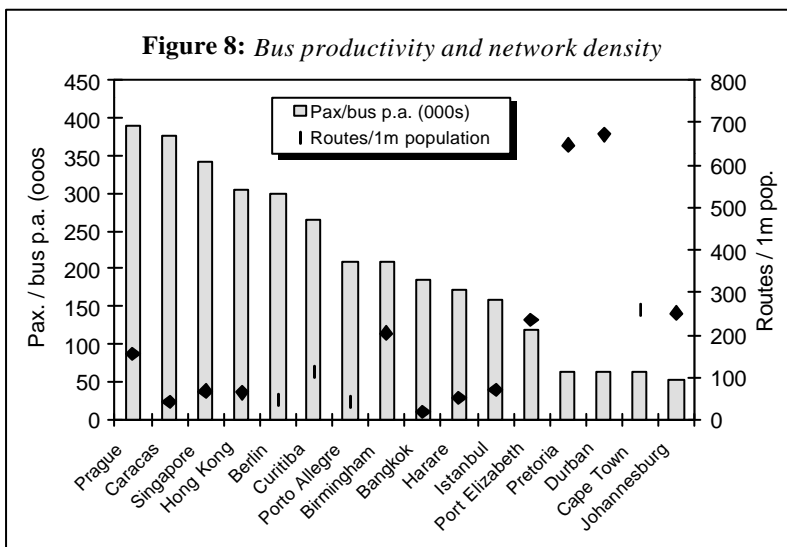


Despite a sustained increase in demand, government subsidy cut backs have reduced rail services over recent years. Scheduled weekday services have declined by about one third between 1987 and 1999 (see Figure 7). From a passenger perspective the most negative consequence has been unacceptably high levels of overcrowding on some lines. Services over some sections of the Khayelitsha line are at over 150% of their passenger carrying capacity in the peak direction during the peak hour. A very real fear for these grossly overcrowded trains with their ageing rolling stock (average age 30 years

and more) is that equipment failure may lead to accidents with potentially horrific consequences. It is a tribute to the operator that such a high safety record has been thus far maintained with increasingly obsolete equipment.

Allied to overcrowding are the problems of fare evasion and a lack of security for passengers. The current rate of injuries and fatalities on the rail system due to crime and violence has followed a disturbingly rising trend over the past five years. Personal security related issues constitute 28% of the sources of complaint about services. This is having a profound effect on travel patterns and people's choice of transport mode.

Fare evasion is rampant with up to 30% of passengers not paying for their tickets on the rail system in the CMA. On the Khayelitsha line the level of fare evasion was recently estimated to be 70%, on the Mitchells Plain line 40% and approximately 15% on the remaining lines. Fare evasion also contributes to the overall public perception that the system is not under control and encourages lawlessness on the trains. Lost fare revenue translates into increased subsidy levels, and unfair competition between modes.



A widely dispersed, unproductive and infrequent bus service

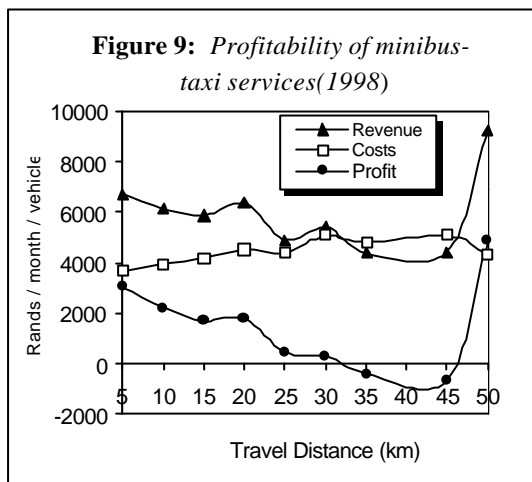
The bus network in the CMA is widespread with approximately 800 routes being operated in the peak period. Relatively long distances, increasingly dispersed destinations, highly peaked demand and intense competition with minibus-taxis and subsidised rail services define the operating environment. Furthermore, the subsidy system gives GABS as the only operator with a permit to provide fare paying services an incentive to

operate as many long distance routes as possible. These conditions combine to have a devastating impact on bus vehicle utilisation rates and hence on costs and overall bus industry sustainability. Different cities from across the world are compared in Figure 8 in terms of bus productivity (passengers carried per bus per annum), network density (routes / million population). Very clearly South African

cities have among the least productive bus systems in the world. Not only are they unproductive, but passenger needs are not being effectively met. Over half the number of routes operated in the CMA have only one bus per day – and that in the peak – which means that bus services only benefit commuters with off peak travel needs of the many poor who are captive to public transport not being adequately met.

Destructive competition and unsafe operating practices in the minibus-taxi industry

The rapid evolution and growth of minibus-taxi transport has clearly demonstrated its ability to respond



to user needs and adapt quickly to changing patterns of demand. Because of their small size, minibus-taxis are able to provide frequent and viable services at relatively low levels of demand. Often minibuses are the only form of transport able to penetrate the labyrinth of narrow roadways found in many informal settlements. Owner-drivers generally operate minibuses, although there are a few owners who operate large fleets.

In terms of permit conditions, minibuses are required to operate only along specific routes. This was introduced to counter violence in the industry caused by different Associations preying on each others routes. Taxi driver discipline and the quality of driving is often poor. This is

mainly the result of intense competition for passengers between minibus-taxi operators themselves, and with heavily subsidised bus and rail services, which places financial operating margins for minibus operators under severe pressure.

Pressure on margins often leads to operators reducing costs by not renewing old, unroadworthy vehicles (the average minibus age is approaching 10 years per vehicle) and spending less than the absolute minimum on preventative maintenance, often with fatal results. During 1998 over 2500 people were killed in minibus-taxi accidents countrywide. In the CMA two incidents alone in 1998 claimed the lives of 17 people. Operators also reduce costs by not taking out insurance for passengers against possible injury from accidents. Minibus drivers try and maximise fare revenue by making as many trips during peak commuter periods as possible. This frequently leads to excessively fast and reckless driving as well as unacceptable behaviour to passengers and other road users.

Figure 9 shows that minibus services are most profitable over shorter routes. Routes over 25 kilometres are financially unsustainable which is particularly the result of competing subsidised bus and rail services. An exception seems to be routes over 50 kilometres where high profits are being realised. This is a special case where minibus-taxis have a virtual monopoly of higher quality services and are therefore able to charge high fares.

User perceptions of public transport

Not surprisingly, user perceptions of public transport services generally reflect the issues raised above. A recent study to develop a corporate branding identity for public transport in the CMA by Modalink (1997) investigated public transport attitudes towards the present transport system. The surveys drew respondents from varied market segments and included current users of all modes as well as potential users. Perceived negative and positive public transport attributes are shown in Table 6 - two ticks or crosses meant that the attribute was felt to be a very strong feature of the mode while an empty space meant that it was not felt to be characteristic of that particular mode of transport. The table is largely

Table 6: Perceived positive and negative public transport attributes

Attribute	Train	Bus	Mini-bus
<i>Positive attributes</i>			
Convenience	✓		✓✓
Quick / fast	✓		✓✓
Comfortable	✓	✓	
Safer from accidents	✓	✓	
Sociable	✓		✓
Reliable	✓		
Cheaper			✓
Safer from crime		✓	
Widely available			✓✓
Peaceful / relaxing	✓	✓	
<i>Negative attributes</i>			
Access to service difficult	✗		
Unreliable		✗✗	✗
Incompetent drivers			✗✗
Poor driver & staff attitudes		✗	✗✗
Poor condition of vehicles	✗		✗
Lack of insurance for passengers			✗
Unsafe from accidents			✗✗
Problem to other road users		✗	✗✗
Crime	✗		
Violence			✗
Punitive fare structure		✗	
Crowded	✗✗		✗
Slow service	✗	✗✗	
Dirty	✗	✗	

"I immediately think of sardines in a tin"

Bus:

"They're so slow you feel you're never going to reach your destination"

Minibus-taxi:

"The taxi is very convenient because it comes where a bus or a train can't pick us up. You can just get on at the corner, whereas with a bus you can't".

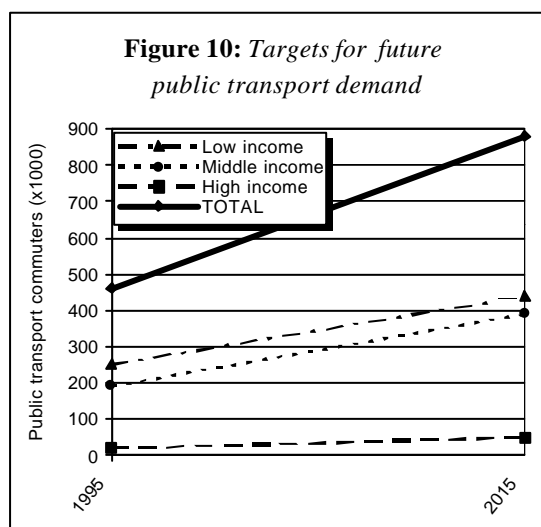
"... taxi drivers drive recklessly, they forget that they are carrying people's lives. If you comment about this, the taxi driver tells you the taxi is his"

"Sometimes I close my eyes when I get in the taxi and I don't open them before I get out".

"If you feel like taking a risk, take a couple of taxis"

Future demand trends

In view of policy objectives, targets to reduce car dependence in the CMA have been set. The anticipated successful achievement of these targets, together with the anticipated increase in the number of captive users, is likely to result in the demand for public transport doubling by 2015 (see Figure 10). However, these targets are only likely to be achieved if there is political and institutional commitment to implementation of policies aimed at:



- accelerating and sustaining dedicated funding for a vastly improved and expanded public transport system
- reversing the trend towards decentralised and dispersed land uses - both large, multi-use, car driven commercial land uses as well as low income housing projects.
- restricting unsustainable growth in private car use through travel demand management measures

A key aspect of this future growth scenario is that the future demand for public transport is likely to be increasingly concentrated within the low and middle-income market segments who are largely dependent on public transport for work and other essential journey

purposes. For example, for every high-income commuter by 2015, it is estimated there will be 20 low and middle income commuters.

KEY STRATEGIC CHOICES

Planning professionals, policy makers and the people of the CMA generally agree that a well-utilised, efficient and affordable public transport system is essential for the future social and economic well-being of the region. A much improved, world-recognised public transport system offering a wide variety of integrated and sustainable services is needed, not only for mobility purposes, but also to achieve broader social and developmental objectives, which include:

- The provision of affordable services to the urban poor, for work and other essential journey purposes
- The creation of viable and attractive transport alternatives to car users
- Services which benefit visitors and holiday makers
- Transport for the young, old and mobility disadvantaged
- The strengthening of regional, inter-city transport connections
- The achievement of environmental goals
- The social and economic development and restructuring of the metropolitan area

To fulfil this vision and meet the MSA goals, requires a strategy comprising actions that will best achieve policy objectives. In South Africa resources are limited, but scope for improving service levels and satisfying user needs is unlimited. Transport strategies are therefore essentially about making choices and the key transport choices must address at least two fundamental questions:

- Where do we want to invest scarce resources?
- Which customers do we prioritise to serve?
 - at what level of cost?
 - at which levels of service?

Once these questions have been addressed, then appropriate implementation programmes can be put in place. The following sections reflect on how the CMA intends addressing these questions.

INVESTMENT OF SCARCE RESOURCES

One of the principal objectives of government policy is to create integrated metropolitan transport systems which will promote the concept of “seamless” travel between different public transport modes and services. The main aims of modal integration are to:

- provide metropolitan-wide access and mobility in the most cost effective manner
- improve levels of service, while reducing user costs and travel times
- reduce operating costs and subsidies by promoting the optimum use of each mode
- rationalise and control the provision of services by eliminating duplication and parallel subsidies
- eliminate destructive competition between service providers, while guarding against monopolies

To achieve these objectives in the CMA, a metropolitan public transport system needs to be created consisting of a primary network and supplemented by secondary (but regulated) support services. This is a major departure from the present, where rail and road-based modes tend to operate independently.

The primary network would consist of the following broad types of service:

- **Corridor services:** Operating at high frequencies during the morning and afternoon commuter peak and then at lower frequencies in the off peaks for 18 hours per day along semi-exclusive or

exclusive rights of way, with relatively frequent stops and moderate speeds. These services are intended to promote metropolitan scale high density, mixed use corridor developments as identified by the MSDF and also provide access to all major metropolitan commercial and business developments.

- **Metropolitan services:** Providing connectivity between remote parts of the metropolitan area and to expand the general coverage and integration of metropolitan services. Also providing dedicated services between major generators such as the city centre and the airport. Frequencies would be high during the peak periods and service schedules would dovetail throughout the day with those of the corridor services.
- **Express direct and limited stop services:** Operating primarily during the peak hours along the same networks as corridor and metropolitan services, with stops only at major interchange points.

In addition to these services, the primary network should incorporate a system of interchanges and termini that will promote modal integration and establish some form of hierarchy in the provision of metropolitan public transport services. Secondary support services should complement the primary public transport system by providing localised services for the benefit of specific communities, interest groups or markets.

The secondary network would consist of the following broad types of service:

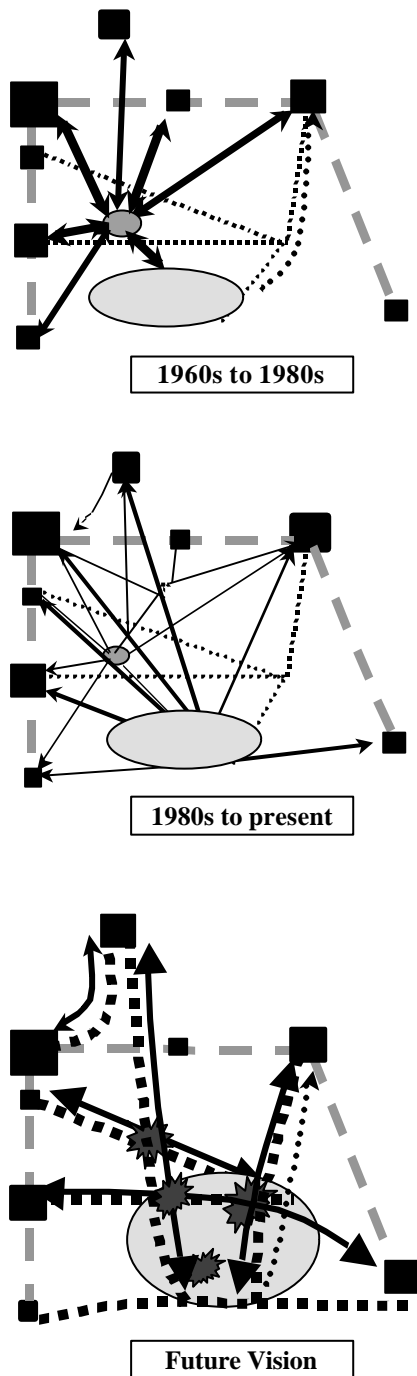
- **Feeder services:** connecting residential areas and/or lower order activity centres to a primary service at major rail or bus interchange points
- **Shuttle services:** providing dedicated, short distance services between major activity centres
- **Distribution services:** providing services within a major activity centre such as the Inner City Area
- **Demand responsive services:** whose routes and schedules respond to the needs of individual passengers

An essential building block for a successful integrated multi-modal public transport system in the CMA is the development of a broadly accepted, realistic and sustainable statutory long-term network plan for the area. Such a network has been defined and developed in terms of the following key principles:

- To provide metropolitan-wide access and mobility in the most efficient and cost effective manner
- To maximise the use of existing resources (rail infrastructure, future rail reserves, roads of metropolitan significance and future road reserves)
- To create a strong element of permanence, road-based services should be located in such a manner as to allow for future upgrading to dedicated ROW operations
- To support corridor and nodal developments as identified in the MSDF
- To promote route continuity
- To promote operations between well defined interchange/terminal points
- To promote metro type operations (high frequencies of service and greater coverage, but fewer direct services with more appropriately-designed interchanges)
- To eliminate parallel subsidised services
- To promote the broader concept of public transport, rather than commuter transport

Conceptually this is shown in Figure 11 and the evolution of the public transport network is described in Table 7.

Figure 11: Evolution of the public transport network in the Cape Metropolitan Area



Key:

- Low income residential township
- Established activity centre / interchange
- Bus hub
- Major road links
- Frequent trunk bus service
- Express bus service
- Interchange / activity centre with feeders
- High density / mixed use activity corridor
- Established rail based activity corridor
- Primarily peak period services

Table 7: Past and desired future development of public transport services

Period	Characteristics
1960s to 1980s	<ul style="list-style-type: none"> ▸ Hub and spoke bus network operated at high frequencies to support rail service. ▸ Highly efficient use of buses ±120 m passengers p.a. and 550 peak period buses. ▸ High proportion of passengers required interchanging. ▸ Strict regulation limits competition. ▸ Car travel became increasingly attractive. ▸ Hubs located off main public transport arterials due to town planning of cellular suburbs.
1980s to present	<ul style="list-style-type: none"> ▸ Regulation of public transport relaxed. ▸ Increasing competition from minibus-taxis and private transport. ▸ More direct bus services to compete with minibus-taxis (less interchanging), decline in hub and spoke services and a decline in bus passengers. ▸ Increase in number of bus and minibus routes. ▸ Decline in frequencies of all modes, especially during off peak – many routes have peak period services only. ▸ Changed network more inefficient especially for buses – longer travel distances, higher subsidies and lower passengers / bus operated ± 40 million passengers p.a. and 700 peak hour buses.
Future vision	<ul style="list-style-type: none"> ▸ High frequency, 18 hour trunk road based services along high density mixed use activity corridors not served by rail. ▸ Rail provides the backbone for the public transport system. ▸ Location of major interchanges on activity routes where activity corridors cross. ▸ Regulated competition – competitive tendering for road based contracts and rail concessioning. ▸ Feeder services to main interchanges and activity centres. ▸ Express services along major mobility routes where required. ▸ Competing modes not subsidised unless for reasons of capacity constraint on the primary mode. ▸ Through ticketing and revenue sharing arrangements between different trunk services (including rail) and feeder services. ▸ Marginal cost pricing applied to peak and off peak. ▸ Market segmentation leads to a wide variety of services being supplied. ▸ Dedicated sources of sustainable funding established. ▸ Unitary branding of vehicles and infrastructure.

The proposed restructuring of the public transport network and services will have potentially significant impacts on how users experience the system. Table 8 shows an assessment of the likely positive and negative impacts of the proposed restructured network on the most common attributes experienced by passengers (Greater Pretoria Metropolitan Council, 1999).

Table 8: *Likely impact of changes in service levels on passengers*

Attribute	Impact	Negative impact	Positive impact
Fare	None	-	-
Walking time	Increase	✘	
Travel time	Decrease		✓
Frequency	Increase		✓
Number of transfers	Increase	✘	
Travel alternatives	More		✓
Information	Better		✓
Security	Better		✓

In previous sections it was argued that the captive user market should be prioritised. However, to adequately answer the question of at what levels of service and cost, it is necessary to be able to quantify how captive users are likely to respond to changes in service levels and fares - at the end of the day, specific fare levels must be set and service levels provided.

CONCLUSIONS

This paper has reviewed the influence of public transport on the spatial development of metropolitan Cape Town. While it may be concluded that current planning will benefit users and appears to be consistent with national, provincial and metropolitan development goals, a fundamental question is: are the assumptions about the economic and spatial development trends on which it is based sound? If the answer is no, then the danger exists that this planning will become to a greater or lesser extent redundant and a waste of time and money. For example, the private and public sector investment trends discussed earlier have particular relevance for the spatial form of urban growth.

Up to now the conventional wisdom of spatial planning appears to ignore these structural changes and operates as though the traditional patterns of growth will continue. In the CMA for example, decline in the clothing sector is likely to reduce the demand for traditional industrial space in older urban areas, while growth of media industries may focus demand new zones. An increasing growth in tourism as well as office space is leading to development of areas of high natural and entertainment amenity and which are free from the crime and grime of many of the traditional growth areas. Similarly as new markets in the business sector develop, partly through the outsourcing of former in-house services and partly through the development of new types of services (such as IT services) means the possibility of greatly increased spatial separation between suppliers and consumers of such services. On the public sector side, the low income housing policy as it is implemented at present appears to largely ignore “approved” spatial development policies, and is imposing massive short and long term opportunity costs on many other sectors. The result is an increasing mismatch between the MSDF and private and public investment trends.

An adjusted approach may be called for in which the private and public sector investment and structural economic realities and trends are re-examined and understood in terms of their spatial implications. Future spatial and transport planning should then take these factors far more into account than it does at the present.

CONCLUSIONS

This paper has reviewed the user needs and current public transport operations in the Cape Metropolitan Area. It has shown evidence that the public transport services are unsustainable in terms of increasing subsidy requirements as well as meeting user needs effectively. Proposals to restructure the public transport system and to use SP techniques to identify and address user needs are described. At present strategies to implement these changes are being drawn up so there is no evidence on the success or

otherwise of these proposals. Clearly therefore effective monitoring strategies will be needed to track the effectiveness of these proposals in meeting policy objectives.

To develop policies that effectively address the challenges facing transport authorities, problems, issues and strategies need to be identified on the basis of reliable and accurate data. However, conventional methods of collecting that data are often too costly and restricted to examining actual travel choices. This paper has shown that properly designed SP surveys offer a cost-effective method of providing appropriate market research information on the likely response of users to changes in the public transport system. In South Africa however, the developing context within which SP methods are to be applied is often significantly different from conditions in developed contexts. SP techniques will therefore frequently require innovative adaptations and sometimes different approaches to those most commonly applied in developed contexts. This will provide fertile grounds for the development and transfer of such adaptations and techniques between developing contexts.

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THE INFLUENCE OF PUBLIC TRANSPORT ON SPATIAL DEVELOPMENT IN METROPOLITAN CAPE TOWN: PAST, PRESENT AND FUTURE

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