

TRAVEL DEMAND MANAGEMENT IN MIDRAND

An Initial Assessment of the Experiment

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ABSTRACT

Since 1998 Midrand has been the site of the first coordinated implementation of Travel Demand Management (TDM) in South Africa. As a demonstration project co-funded by national and metropolitan government, the project aimed at assessing the appropriateness of TDM in the local context. TDM has lately been hailed as a cure-all for traffic congestion, environmental degradation, and government's inability to keep up with infrastructure expansion needs - problems increasingly faced by South African cities. This paper considers the likely truth in such claims from a policy perspective, based on some of the initial outcomes of the experiment.

A brief overview is given of the pilot project and its implemented measures. These included a land use component, development incentives, priority measures for high occupancy vehicles (described in more detail in an accompanying paper), and a rideshare agency. Some of the major issues around implementation of each component are discussed. An assessment is given of the likely impact of the measures, both in the short and long term.

Lastly, some pointers are given around the implementability of TDM in South Africa. A strategy focusing on incentives rather than disincentives is more likely to be politically palatable in the short term, while paving the way for more controversial measures (like pricing) to be introduced later. It is also suggested that the IDP process may provide opportunities to achieve the multidisciplinary needed to develop a common vision and cooperative action within the local authority. The active involvement of provincial government to provide an enabling policy framework is very important.

INTRODUCTION

Over the past few decades South Africa has seen rapid growth in automobile ownership and use. Apart from the immense advantages car users have received in terms of increased mobility, the costs of growing car use has also been becoming more apparent. These problems include increased congestion, smog and other forms of pollution, dependence on imported fossil fuels and demands for costly expansion of the road infrastructure.

The disadvantages of private vehicle use are furthermore set to increase, as it has been estimated that the number of vehicles on the country's roads will increase by roughly fifty percent between 1995 and 2005 (Mirrilees et al., 1996). Economic realities hold that large-scale road development cannot provide a lasting solution to these transport problems. Worldwide experience has shown that the construction of more roads ultimately fail to reduce congestion – as soon as new road space becomes available, it is filled.

These facts have prompted government to adopt policies and legislation to re-orientate our urban transport system towards a more balanced transport system, including a stronger role for public transport. One of the policy instruments that have been punted as a solution to these problems is Travel Demand Management (TDM). There are various definitions of TDM, but one that is used widely declares:

“Travel Demand Management is an intervention (excluding provision of major infrastructure) to modify travel decisions so that more desirable transport, social, economic and/or environmental objectives can be achieved and the adverse impacts of travel can be reduced.”

TDM is therefore any action aimed at influencing people’s travel behaviour such that alternatives to the single-occupant automobile are considered and/or congestion is reduced. Actions typically consist of a mix of incentives and disincentives to make public transport, walking, cycling and travel substitution (e.g. flexitime and telecommuting) more attractive.

This paper considers the likelihood of achieving this aim by applying TDM in South Africa, in light of experience with a pilot application of TDM in Midrand. The first of its kind in this country, the TDM experiment in Midrand is still ongoing, but the time is right to assess some of the lessons learnt from this experience for the benefit of other urban areas struggling with problems of traffic congestion.

The paper first gives some background to the experiment, followed by a brief description of the specific measures implemented. These measures include:

- priority lanes for public transport and high occupancy;
- a rideshare agency to provide commuter assistance and ridematching services; and
- a land use management system with incentives to promote strategic densification in Midrand.

We then consider lessons learnt from the implementation of each measure, and finally draw general conclusions.

BACKGROUND

The National Department of Transport (NDoT) launched the pilot project as a demonstration project on formulating a TDM strategy for a typical growing urban area. Midrand was chosen as the location because it is a fast-growing urban area with high levels of traffic congestion and a poorly developed public transport system. Midrand Metropolitan Local Council administered the 240 square kilometre area, which includes approximately 1150 ha of commercial, corporate and industrial land use spread out mostly in business park-like environments. The 1999 population stood at 240 000, of which about 84% lived in lower income areas including Ivory Park. In December 2000 the Midrand Local Council was incorporated into the Greater Johannesburg Metropolitan Council.

The TDM project was jointly funded by NDoT and Khayalami Metropolitan Council, managed by the CSIR, and executed in conjunction with all levels of government.

Many of the measures that could be included in a TDM programme, and indeed some of the measures that were implemented in Midrand, have been tried in other cities in South Africa. What makes the project unique is the fact that it was the first time that a package of measures were implemented together with specific TDM goals in mind.

OVERVIEW OF PILOT PROJECT

Initiation of the pilot project in 1997 led immediately to the establishment of a multidisciplinary working group including representatives from local, provincial, and national government, consultants and CSIR. The working group prepared a TDM policy for Midrand, based on the development framework for the area. It was seen as crucial that the TDM programme should fit closely within the overall development and transport vision for Midrand. This was followed by a TDM strategy, which investigated the feasibility of implementing a number of specific projects. The outcome of this process was identification of four implementation projects which were mutually supportive. They addressed the areas of land use, development incentives, road management, and commuter assistance. The measures were designed to be incentives rather than disincentives, as the timing was not considered right for implementing disincentives against driving alone in South Africa.

Detailed planning studies for these four projects were undertaken prior to commencing implementation. More information on the process is provided in Schnackenberg et al., 1998, while the planning reports were published by the CSIR (1999a, 1999b, 1999c, 1999d, 2000).

Broad and intensive consultation was undertaken to ensure broad ownership of the project. Participation was obtained from the Midrand business community, potential developers, Midrand's commuters and residents, as well as taxi operators.

High Occupancy Vehicle Priority (HOV) Measures

High Occupancy Vehicle (HOV) measures in Midrand were implemented with two main objectives in mind: to help maximise the person-carrying capacity of existing roadways, and to improve the reliability and travel times of public transport and other high occupancy private vehicles (vehicles carrying the driver plus at least one other passenger). The latter objective serves as an incentive for promoting the use of public transport and lift clubs.

HOV measures involve the demarcation of road space for exclusive use by public transport vehicles and HOV's. The measures consist of queue jumping lanes implemented at signalised intersections where HOV's can pass single-occupant traffic queues. Two intersections on major public transport routes leading into the Midrand Central Activity Area were chosen as implementation sites. Road signs and markings which are already available and enforceable according to South African legislation, are based on a diamond symbol indicating the minimum number of occupants required to use the facility.

Although these queue-jumping lanes are being tested on a small scale and only during peak periods (7:00 to 8:30 and 16:00 to 17:30 on weekdays), the full benefit of HOV measures will only be realised when it is implemented as part of a regional HOV strategy. Studies have shown that, if existing commuters in Midrand can be encouraged to increase their average private vehicle occupancy from its current level of 1.4 people per car to 2 people per car, Midrand's existing road network can absorb the very high growths in personal travel over the next five years with a minimal need for road expansion and with no increase in congestion. While this situation is clearly unrealistic given current travel habits, it serves to illustrate the significant savings in road construction and upgrading that TDM may leverage in the longer term. Related benefits include slowing the growth in air pollution as a result of vehicle emissions, and reducing energy consumption correspondingly.

A substantial marketing campaign was launched to inform the public of the HOV facilities and how to use them. Marketing methods included posters, distribution of information pamphlets at the HOV sites, and radio and newspaper coverage. Special information sessions were held with taxi drivers who would use the facility.

Commuter Services: Ridematching and Information

Commuter Services was established as an agency under the non-profit Midrand Transport Association to promote the main principles of TDM through co-ordination of various transport initiatives. Commuter Services provides information services and assists both employees and employers in addressing their transport needs. A primary task of the agency currently is to support the development of the HOV network by providing a ridematching service to commuters who wish to establish lift clubs. A database on commuters offering or needing ridesharing opportunities is maintained and lift club members are assisted in getting their group started. Awareness and outreach activities are also being undertaken.

Commuter Services is being marketed as part of the *Clean Commute* campaign, which is aligned to the environmentally focused Midrand *EcoCity* initiative.

Employment Location and Density Management System

The viability of a future public transport network in Midrand depends on whether land development is focused into high-density areas with sufficient travel activity. The overall aim of the employment land-use location and density management system (codenamed *Nodeplanner*) is to enable Midrand to pro-actively manage its land-use in support of such a transport vision.

Employment land-use can generally be separated into people-intensive land-uses such as office, conference, education and retail, and goods-intensive land-uses such as industrial and commercial. Each of these groups can be divided into land-uses that generate mostly peak-period traffic (e.g. offices), land-uses that generate mostly off-peak traffic (e.g. retail) and land-uses that generate unpredictable flows (e.g. conference).

In terms of the Nodeplanner, development of people-intensive land uses is directed towards the Midrand central activity area (the Halfway House area) to support employment densification of the primary node and the major corridors and to locate them optimally with regards to public transport. The management tool places people-dependent land-uses that generate off-peak traffic near peak-traffic generating land-uses so that all-day public transport services can be promoted and vehicle idle times reduced.

Goods-intensive land-uses generally need large amounts of floor space, which makes significant employment densification almost impossible. Commercial and industrial uses, and the heavy vehicle traffic they generate, are therefore allocated to areas outside the major employment hubs.

Economic Incentives to Encourage Denser Development

Economic incentives have been chosen to encourage developers to locate in Midrand's central activity node where significant service capacity has been provided, but where commensurate development is not occurring to any great extent. The most significant incentive is a waiver of the bulk services contribution to developers who locate new developments in the node. It was

estimated that this waiver could save a developer approximately R1.1 million per hectare of office or retail development in the node. The waiver was implemented for an initial period of a year between November 1999 and October 2000, to be revised at the annual budget before reinstatement in the next financial year. Given the administrative changes that took place after the Local Government elections in November 2000, the Council did not have the power to extend the implementation period of the incentive.

A further incentive that was investigated but not yet implemented, had the dual aim of providing an additional incentive for strategically located development, and reducing the long-term over-supply of parking in the central activity area. Parking constraints is seen in TDM literature to be one of the most powerful tools open to land use planners in seeking to reduce car based travel in the short term. The bulk/parking reduction scheme allows developers to reduce the number of parking bays provided per 100 square meter of floor area, in exchange for building at floor area ratios (FAR) higher than 1.2. The current average FAR in Midrand is about 0.6. Thus, developers are incited by the ability to increase the amount of lettable floor space, and by saving on the costs of providing parking. It was estimated that in the short to medium term excess surface parking is available in Midrand to absorb the additional parking demand. In the longer term parking control and public transport improvements will combine to reduce the overall demand for parking.

ASSESSMENT

Political and Public Support

Support for the TDM initiative was very high among political stakeholders in the Midrand Local Council. The Council lent its full support to the programme as a local government initiative, and passed the TDM policy, strategy, and implementation plans through Council resolutions. A critical aspect of this support was the narrow alignment between the TDM objectives and another major initiative of the Council, namely the Midrand *EcoCity* project. TDM was seen as a major element of the city's drive towards greater environmental sustainability.

TDM also addressed a major concern of the public: growing traffic congestion. Feedback received from the public, through commuter services, was very positive about all four implementation projects.

In order to gauge the general public's attitude towards the principles of TDM, a telephone survey was conducted in February 2001 among people who work in Midrand. The sample of 200 workers was drawn randomly from businesses, government and academic institutions located in the area.

Respondents were asked the following question: "Midrand is trying to improve traffic, by encouraging people to not drive their cars alone to work, for instance by improving public transport, and by encouraging lift clubs. Do you support this?"

Ninety-three percent of respondents responded positively, and only four percent negatively. This indicates overwhelming public support for the basic principles of TDM. The question did not mention any potential disincentives to driving, nor did it tie the question to individual action, such as the public's willingness to pay for TDM measures or to submit to car restraint measures. The answer should therefore not be construed as a public endorsement of all types of TDM measures.

High-Occupancy Vehicle facilities

The HOV facilities opened on 5 June 2000. Despite the public's initial unfamiliarity with the concept and the signage and roadmarkings, the facilities operated relatively smoothly from a traffic operations point of view. The Midrand traffic department maintained a heavy presence during the first four weeks, and continued to distribute information leaflets and instruction to violators. After the first month summonses with a R200 fine were given to violators.

The operational impacts of the lanes were monitored through before and after traffic counts. Overall the HOV lanes did not appear to have a consistent impact on travel times, queue lengths or vehicle occupancy. This result was not unexpected, given the fact that the intersections were not heavily congested before, thus diluting the potential benefit bestowable on HOV users. Problems were also experienced with high levels of violations, in the region of 30% to 50%. Although law enforcement received much attention, an even more concentrated effort was needed to enforce the lanes.

The HOV facilities did however succeed in bestowing a number of benefits on target user groups. Interviews with taxi operators using the facilities showed that they were very positive towards the measure, and believed it improved their travel times.

General public support for the lanes is also high. In the telephone survey of Midrand workers, respondents were asked whether more lanes like these should be built in Midrand and on freeways. Of those aware of the existing lanes, 68% said yes.

These results suggest that HOV facilities as a TDM measure are at least operationally feasible, and can popular with users if benefits are bestowed on public and private transport users alike. However, small-scale pilots are perhaps not on the right scale to achieve these benefits in a measurable way. The true longer-term benefits of HOV facilities in terms of increasing the person-carrying capacity of roadways and inducing a shift towards higher occupancy modes can only be realised once a larger network of preferential facilities under really congested conditions is developed.

Commuter Services and Ridesharing

The call-in service operated by Commuter Services was well received from the start. Following the marketing and promotion campaign, an average of 45 calls per day was logged during the first ten days of operation (which corresponded to the opening of the HOV facilities). Approximately ten percent of callers wanted information on the HOV facilities, with the rest enquiring after the ridematching programme.

Approximately 25% of callers were prepared to give the required details to join a lift club. The number of lift clubs that could actually be facilitated by Commuter Services was initially quite low, due to the fact that origins and destinations covered a very large geographic area. Lift clubs were thus initially restricted to people working in Midrand, to fix at least the work end of trips. Traffic congestion is furthermore such that work locations have to be very close to each other before potential ridesharers will accept the match. The N1 freeway and its congested interchanges provide a barrier; lift clubs could not accommodate people working on both sides of the freeway because of the time needed to cross the freeway in peak times.

The number of lift clubs facilitated by Commuter Services reached thirteen by January 2001. People who were actually matched into lift clubs reported being satisfied with the service received.

In order to get a better sense of the potential market for lift clubs, the telephone survey of workers probed people's willingness to consider ridesharing under different circumstances. According to current commute patterns, 19% of commuters, or 27% of car users, use lift clubs at least some of the time (lift clubs were defined as more than one person not from the same family sharing the ride to work). About 61% of lift clubs were formed within the last nine months (i.e. since establishment of Commuter Services), suggesting that the promotional efforts of the agency could well have had some impact on the forming of new lift clubs even if the agency did not directly facilitate them. Based on the above numbers, it is estimated that lift clubs reduce the number of car trips to work by about 18%.

	Number	Percentage
Currently ridesharing	38	27%
Would consider ridesharing with no additional incentive	32	23%
Would consider ridesharing with incentive:		
If petrol price rises to above R5	49	35%
City provides Guaranteed Ride Home	48	34%
City provides pre-screening of applicants	46	33%
More HOV lanes provided to gain 15 minutes time savings	51	37%
TOTAL CAR USERS	139	100%

TABLE 1: Current and potential market for ridesharing in Midrand

The survey also found evidence of a significant market for expanding ridesharing, based on respondents' stated willingness for considering it as an option (see Table 1). Apart from current ridesharers, another 23% of people with access to cars would consider ridesharing, for a total of half of all people with access to cars. This market could probably be exploited effectively by providing encouragement and information about ridesharing. A further ten percent of people with access to cars can be made to consider ridesharing, by implementing a variety of incentives such as time savings for ridesharers through HOV lanes, pre-screening applicants to provide greater security, or providing a guaranteed ride home. No doubt these figures are an overstatement of what can be expected in reality, but it does highlight a basic positive attitude which can be exploited by an effective TDM programme.

People who would not consider drivesharing do so because of reasons largely beyond the control of a TDM programme. These include long or unpredictable work hours, and the need for a car during the day – these two reasons accounted for 82% of the reasons given why car users would not consider ridesharing at present. It is thus suggested that a ridesharing programme can make a large initial impact on ridesharing simply through information and promotion efforts targeted at the right people, without attempting the harder task of changing company work policies.

The survey also found a very high acceptance of ridesharing among current public transport users, who are overwhelmingly without immediate access to a car. The implication is that, without improvement of the public transport system, current bus and taxi users would become car users (and maybe ridesharers) as soon as they get the economic means. This would work against the ultimate aim of TDM by decreasing public transport ridership in favour of automobile use. Thus the improvement of public transport should remain a major TDM strategy.

Land Use Measures

After the Midrand Development Framework was realised according to the Nodeplanner principles, Midrand achieved some success in densifying the N1 corridor strip. There was limited market response to the bulk contribution waiver incentive. The Midrand experience illustrated the massive impact that external factors can have on such an initiative. New demarcation boundaries and new administrative structures have effectively resulted in the termination of the incentive. Sections of the Midrand central activity area have been incorporated into different planning regions of the Johannesburg Metropolitan Council. This negatively influenced the effectiveness of the incentive, as it introduced uncertainty into developer decisions for the area.

A further factor was the lack of a marketing strategy. No active marketing of the incentive took place. The council anticipated undertaking the marketing of this incentive in conjunction with the reduction in parking requirements incentive, which has not yet been implemented.

The exercise showed that it must be kept in mind that land use planning is very important for influencing travel patterns, but it is a longer-term solution (10 years or more). This is important when evaluating the impact of supporting economic incentives used in achieving the change in land use and the time of implementation of the incentives.

CONCLUSIONS AND RECOMMENDATIONS

Undoubtedly Travel Demand Management has its place in the fight against growing traffic congestion and its associated economic, environmental and social costs. Worldwide opinion seems to agree that the changing of public perceptions, demands, and ultimately behaviour is needed if a sustainable modern transport system is to be achieved. Travel Demand Management is aimed at exactly that. It thus fulfils a vital role in being the outward or community-facing ingredient of a congestion management strategy.

The experience with the Midrand TDM pilot project showed that the TDM approach can be very popular with the public, as much as with the political stakeholders. Of course as a first pilot project of its kind the project purposely steered clear of any major potentially controversial measures. Future TDM projects seeking to build on this experience while achieving more measurable impacts need to tackle more problematic areas with a more ambitious approach. Supporting legislative and planning frameworks giving real incentives to non-SOV users are needed to make TDM work.

The project benefited from being aligned closely with other popular initiatives including the Midrand *EcoCity* initiative. It demonstrated a readiness among the South African public – particularly car users who would be most affected – to grasp the need for alternative transport policies. A well-managed TDM programme can exploit this to the benefit of all transport users.

The Midrand experience also showed that TDM can only come to its rightful place if it is supported by other more supply-oriented measures. The ultimate objective of TDM – namely increasing average vehicle occupancies by increasing commuters' use of drivesharing, public transport, and non-motorised modes – can only be achieved if these alternative modes are sufficiently attractive to current SOV users to outweigh the associated (generalised) costs of switching to these modes. In South Africa this is largely not the case at present. Effective supply-oriented responses, of which improved public transport and preferential infrastructure for high occupancy vehicles in the right places are the most important, are needed as a necessary complement to TDM.

There is little evidence of political willingness to consider implementing car restraint through pricing options at present, even though the opportunity may be presenting itself soon with a number of tolled urban freeways currently being planned where differential pricing may be applied. International evidence has shown the pricing strategy to be potentially most effective by far in achieving congestion relief. But if this strategy were ultimately to be pursued, the existence of viable and high quality alternatives will be absolutely essential to its acceptability and its success.

Given the current state of public transport in South Africa, one should thus guard against overly optimistic promises about what TDM can deliver. A well-considered TDM programme that is well-integrated within both the development and the transport spheres of local government has the best chances of success. Overcoming the divide that exists between the development planning and transport management sections of most metropolitan areas in South Africa will be one of the major stumbling blocks to achieving this objective. But it is hoped that the Integrated Development Planning process will provide an effective mechanism for incorporating TDM strategies within the urban management approach over the next few years.

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