

SOUTH AFRICA'S FIRST NATIONAL TRAVEL SURVEY: 2003

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ABSTRACT

This keynote address describes a watershed event in land transport in South Africa, namely the first National Travel Survey (NTS). The purpose of the survey is outlined in the paper and the research leading up to the decision to go ahead with the NTS is described. The National Travel Survey is the culmination of many years of background research and two extensive feasibility studies.

The objectives of the survey are described in detail and an indication is provided as to how the results will be used by national and provincial government for policy monitoring and in reviewing the implementation of national transport policy.

Fieldwork was undertaken by Statistics South Africa and completed in June 2003. The survey comprises a sample of 50 000 households which will be representative of the population of the Republic of South Africa (RSA) as a whole and of its 9 provinces and 242 municipalities. During the latter half of 2003 the data will be captured and verified. The results will be verified and will be made available nationally in mid 2004.

A description of the sample and the spatial extent of the survey are provided in the paper. Examples of the use of National Travel Survey information are included in both the paper and the presentation.

1. INTRODUCTION

To fulfil its land transport policy, strategy and implementation functions, the National Department of Transport (NDOT) requires a reliable data-driven understanding of the diverse needs and experiences of the customers for land passenger transport. The NDOT also needs to monitor trends in consumer behaviour and customer responses to changes in the transport system, on an ongoing basis. Such information will facilitate the refinement of policies and strategies.

The previous government commissioned a feasibility study for a National Travel Survey (NTS) between 1987 and 1989 which comprised the following:

- a literature review of international applications of a NTS (Lombard, 1987);
- a study tour to the United Kingdom to obtain first-hand information about the British NTS (Lombard, 1988); and
- a pilot study for a NTS, which tested various types of survey instruments (Lombard et al, 1989).

The results of the feasibility studies were positive about the need for a NTS. The recommendations were, however, never implemented because government priorities changed in the run up to the first democratic elections between 1990 and 1994. After 1994, transport priorities in government were preparing the White Paper on National Transport Policy, developing the necessary legislative framework and restructuring and transforming State institutions.

Once all these tasks were achieved it was timely for the National Department of Transport to revisit the recommendations about a National Travel Survey. To this end, a second feasibility and scoping study for a regular National Travel Survey was undertaken in 2000 and 2001 (TRC Africa, 2000 and 2001).

2. FINDINGS OF THE FEASIBILITY STUDY OF 2001

The feasibility study reported that, in the past, the NDOT had relied upon the following sources of information on passenger travel for monitoring and for formulating policy and strategy:

- *National Passenger Panel (NPP - 1987 to 1994)*. The NPP was a commuter panel comprising a variable sample of between 2 000 and 3 500 households in the major metropolitan areas. The panel composition and survey location were changed from time to time to facilitate the specific needs of the NDOT. Thus, although it enabled some trends to be monitored, such as in the modal share for work journeys for Black commuters, no such reliability could be attached to more fine-level information such as trip origins and destinations. This is because of the small size of the sample. The other main drawback of the NPP was that, with the exception of the 1994 survey, it was targeted exclusively at Black households. The NPP was discontinued after 1994;
- *Central Statistical Services (now Statistics South Africa) October Household Survey (OHS – 1994 to 1998)*. The OHS was used by the NDOT for monitoring passenger travel trends and for policy analysis. The advantage of the OHS was that it was a large sample (30 000 households) enabling some transport analysis at an intra-provincial and intra-city level. The drawback of the OHS was that its travel information was restricted to travel modes, departure and arrival times and trip origins and destinations for work trips. Every 5 years, household travel costs were also collected enabling the percentage of household disposable income spent on transport to be calculated. Accordingly, the OHS was an extremely valuable survey for strategic rather than for detailed passenger transport analysis.

After 1999 the transport questions were dropped from the OHS and there was, therefore, no nationally based information available on the travel patterns and preferences of South Africans. The feasibility study for the NTS concluded that there was a strong case for instituting a National Travel Survey in South Africa. The United Kingdom NTS provides the most comprehensive and best documented survey over the past 15 years and it was recommended that the UK survey should be used as a model for planning for a NTS in South Africa.

In the second part of the 2001 feasibility study, the survey options and levels of analysis for a National Travel Survey were evaluated. The reason for the analysis of different geographic levels was that the content of a survey is materially affected by the uses to which information is to be put and by the required sample size. For example, for a national level survey, a sample size of 5 000 households can be sufficient to give information about customer satisfaction with travel, and provide an indication of trip generation, purpose, travel mode and time by broad categories of users, for example, population groups. At this scale, however, no reliable differentiation can be made between the population groups in the nine provinces.

Five different levels were evaluated namely, national, provincial, metropolitan, municipal and strategic planning zones within metropolitan and district municipalities. In the event, the National Department of Transport decided that it would be most appropriate for the first National Travel Survey to comprise a large sample which would enable the greatest comparison between provinces, metropolitan areas, urban and rural areas and even strategic planning zones within metropolitan and district councils.

3. BASIS OF THE DECISION TO PROCEED WITH A NATIONAL TRAVEL SURVEY

There are costs attached to the execution of the duties and powers of the Minister of Transport, contained in Part 3 of the National Land Transport Transition Act. It was appreciated that a NTS, which can be a costly exercise, will, however, provide customer-based information which will have considerable value to the Minister in carrying out his duties¹. At least half of the strategic objectives of the National Transport White Paper relating to passenger transport have customer-based targets, the attainment of which can be measured by means of a NTS.

The feasibility study noted that a good example of the value of a National Travel Survey in the transport sector, relates to welfare subsidies for public transport. A National Travel Survey will enable transport authorities to effectively target subsidies on the poor, by measuring household income and expenditure on transport.

During 1999, the NDOT undertook research on strategic customer-based passenger transport information (TRC Africa, 1999). The results of the research, which made use of the Statistics South Africa OHS, helped to convince the Minister of the need for, and the value of, national travel information. At the time, the Minister was hard-pressed to provide information relating to passenger travel in South Africa through questions in parliament and through various cabinet and inter-departmental queries relating to, amongst other things, the extent of road-based bus subsidies and the extent of deficit support for commuter rail services operated by Metrorail. The information was of value to the Minister in providing reliable data to various cabinet and cluster committees.

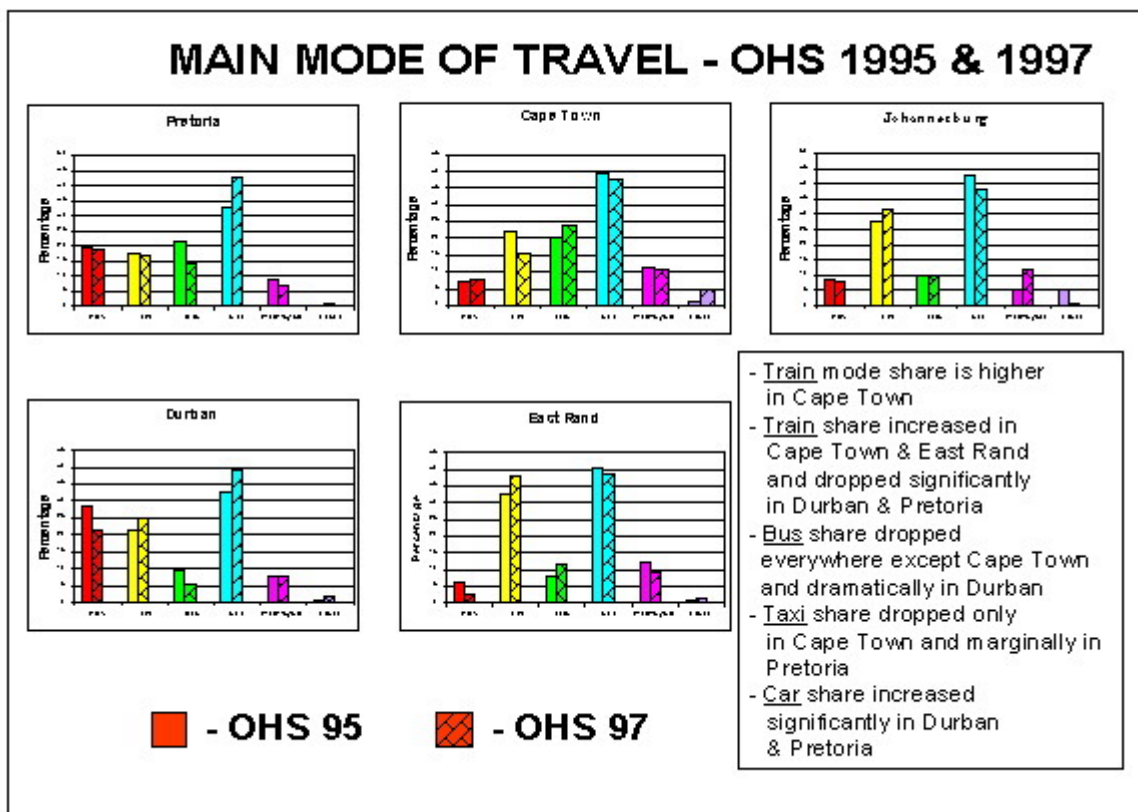


Figure 1. Main modes of travel to work in 1995 and 1997.

¹ Duties include Section 5(4) monitoring policy, Section 5(5)(n) publishing an annual report on key performance indicators (KPI's) and Section 6(2)(a) requiring every MEC, Transport Authority, Core City and municipality to provide the Minister with information on key performance indicators.

An example of this is Figure 1 which shows trends in the main mode of travel to work between 1995 and 1997. It must be evident that this type of information is of extreme value, in both relative and absolute senses, to identify where major adjustments are taking place and to estimate the consequences of such changes, whether in terms of revenue reductions or increases in congestion or fuel consumption. Adjustments in customer mode choices can impact on the demand for bus services and therefore on subsidy and operator profitability.

The example represents coarse level analysis but it must be obvious that having the data available, enables the analyst to query specific areas, for example, estimating the number of people using trains and subsidised buses and comparing different areas and modes. These investigations go further by contrasting the usage of subsidised modes with the incomes of the users, providing an indication of the extent to which subsidies are reaching their intended targets, namely, the lowest income commuters who are captive to public transport.

4. THE OBJECTIVES OF THE NATIONAL TRAVEL SURVEY

The overall *aim* of the NTS is to gain strategic insight into the transport problems and travel patterns of the people of the Republic of South Africa. This will provide the National Department of Transport with information for research, planning and policy formulation.

The information will be used to achieve the following main objectives:

- To assist with the effective targeting of subsidies for public transport.
- To assist in identifying disadvantaged regions for investment in transport infrastructure.
- To measure the key performance indicators (KPI's) for land passenger transport as required by the National Land Transport Transition Act (Act 22 of 2000) and the National Land Transport Strategic Framework.
- To understand the transport needs and habits and/or behaviour of all household members at all times of the day and for all purposes.
- To ascertain the cost of transport for individuals and households and to assess the extent to which they can afford to pay for mobility.
- To assess customer attitudes towards transport services, service providers and the quality of the transport facilities which they are required to use.
- To measure existing car ownership and usage.
- To understand the travel choices of different market segments.
- To determine the extent of accessibility to opportunities such as work, health facilities, education, markets and for social interaction and other needs.

5. THE GEOGRAPHIC BASIS OF THE NATIONAL TRAVEL SURVEY

Mid-Census estimates indicate that the population of South Africa is around 42 million, living in about 10 million households. The municipal demarcation of 2000 partitioned the country into around 60 metropolitan and district councils and around 260 local municipalities within the district councils. In deciding on the sample size for the NTS, it was agreed that it should be sufficient to afford comparisons between municipalities and in some cases between Transport Analysis Zones (TA zones) within municipalities. Accordingly, the sample had to be sufficiently large to ensure that the results are representative of the targeted transport characteristics of each of the municipalities. This was the reason why a large sample of 50 000 households was chosen.

The sample of 50 000 households represents 0.05 per cent of all the households in South Africa. This will mean that, on average, each metropolitan and district municipality will have about 850 households in its sample.

However, the number of households in each municipality will vary depending upon the size of the population in the municipality, to ensure that the sample is proportionate to the population. although the sampling fraction may be higher than 0.05 per cent in some of the municipalities and slightly lower in others.

In deciding on the TA zones for the NTS, the NDOT conducted a Workshop amongst provinces to help them decide on the geographic areas. At the Workshop each province was provided with a map showing the district and municipal boundaries. In addition, a table was provided containing the population figures by urban and rural areas for each municipality within the province. Also provided was a table showing the desired maximum number of analysis zones in each district and/or municipality. In the briefing, provinces were told about the principles for determining the boundaries and the size of analysis areas.

The main principles for determining the TA zones were as follows:

- Boundaries should not dissect Census suburbs or enumerator areas (EA) or former magisterial districts or municipal boundaries.
- Areas should as far as possible be homogeneous with respect to the density of population and/or the broad income group.
- In determining the boundaries, the following should be considered:
 - the balance of population in each TA zone;
 - structural features which may be used for boundaries such as rivers, railway lines, freeways or major arterial roads;
 - the boundaries of service delivery areas; and
 - any significant or functional political boundaries within the municipality.

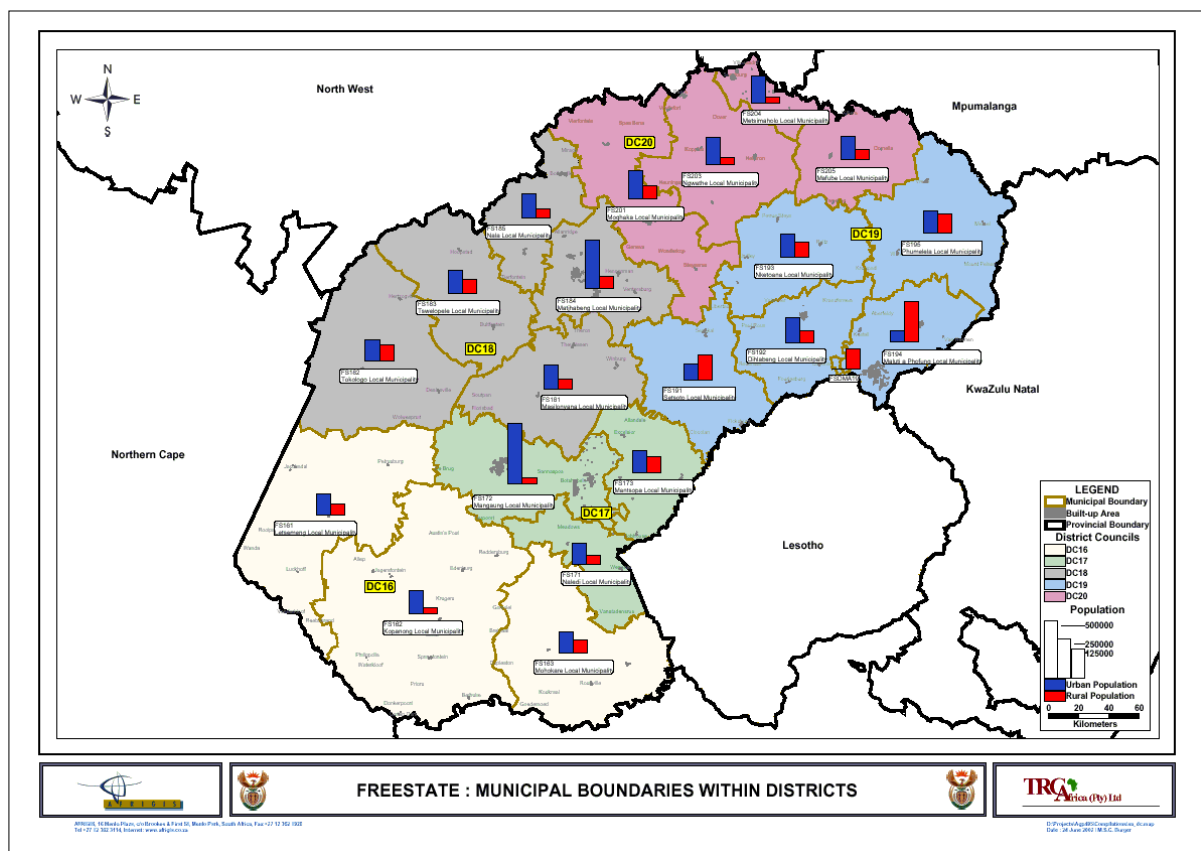


Figure 2. Municipalities used as transport analysis zones in the Free State.

Figure 2 shows the municipal boundaries in the Free State on which the division into analysis zones was based.

In the Free State it was agreed that the appropriate analysis zones should coincide exactly with the category B local municipality boundaries. Accordingly, the figure shows the 5 districts of the Free State in different colours together with the municipal boundaries which would serve as analysis zone boundaries. The one exception was the Motheo District Municipality which includes the local municipalities of Mangaung (Bloemfontein) and Botshabelo. This local municipality warranted further sub-division between its more populous urban and rural areas. Accordingly, Motheo was divided into the Mangaung urban area, Mangaung rural, Botshabelo urban and the rest of the rural district population.

In metropolitan areas the provinces consulted the metropolitan municipalities about the boundaries they would use for strategic planning. These were determined according to transport planning characteristics (such as traffic zones used in transport modelling), or in terms of the boundaries used for service delivery. In the metropolitan areas the number of TA zones varies between 10 and 20.

6. SAMPLE DESIGN FOR THE NATIONAL TRAVEL SURVEY

The NDOT identified 342 national TA zones in consultation with provincial transport departments. From these TA zones, a sample of 50 000 households had to be interviewed in order to collect information about travel patterns and habits. Stats SA overlaid the analysis zones with the Census 2001 Enumerator Areas (EA's) to facilitate the sampling.

The sample design is outlined in the steps which follow:

- The 342 TA zones were overlaid with the Census 2001 Enumeration Areas. Each of the analysis zones will be treated as a reporting domain. Where possible, the zones were further stratified by geography type such as urban formal, urban informal, rural formal and tribal. Each zone was allocated a number of EA's proportional to its size using the enumerated "dwelling unit count" on the Stats SA books as a measure of size.
- The number of EA's allocated to each TA zone was determined using the number of dwelling units in the EA's as a measure of size. The power allocation method was used to determine the number of primary sampling units (PSU's) to be allocated per zone.
- Each PSU number consist of 12 digits, the first 8 representing the EA number and the last 4 the number of the PSU. Ten dwellings had to be enumerated in each of the 5 000 PSU's to arrive at the required sample of 50 000 households. This worked out to an average of 13.3 EA's per zone, based on 10 dwelling units per EA, assuming an equal allocation of EA's to the zone.
- Additional EA's were pooled where the selection criterion of a minimum number of 80 dwelling units per EA was not met, such as in farming areas in the Northern Cape. In this case, the extra EA was taken from the same township, suburb and area as the original EA.
- Once the dwelling units in each PSU were verified and the dwelling unit total was established, a sample of 10 dwelling units was selected from each PSU. Systematic sampling of EA's was used in all cases and equal probability systematic sampling was used to select the dwelling units that were enumerated in each of the EA's that was drawn. This allows for approximate self-weighting of the selected planning units within each of the zones.
- In each household, one person, aged 15 years or older was selected for an interview about their attitudes to transport services. Kish's grid for selection of individuals aged 15 years and older, was used to determine who would be required to complete the attitudinal section of the questionnaire.

Table 1 illustrates the sample allocation for each province by Enumerator Area type. Note the breakdown into hostel, industrial, informal and other types of Enumerator Areas.

Table 1. The sample allocation to each province by EA type.

Province	Number of EA's by type							Total
	Farm	Hostel	Industrial	Informal	Small Holdings	Tribal	Urban	
WC	56	10	2	27	6	-	467	568
NW	56	20	5	3	2	147	149	382
LP	29	2	3	5	4	319	74	436
NC	30	-	-	6	7	11	120	174
MP	44	3	2	25	2	101	156	333
KZN	70	9	2	75	8	385	397	946
GP	19	55	6	124	26	2	702	934
FS	64	15	5	23	3	26	277	413
EC	37	1	-	45	4	449	278	814
TOTAL	405	115	25	333	62	1440	2620	5000

Figure 3 shows the distribution of the sampled EA's. It demonstrates the coverage throughout the RSA and that the EA's in the rural areas are much larger than those in urban areas.

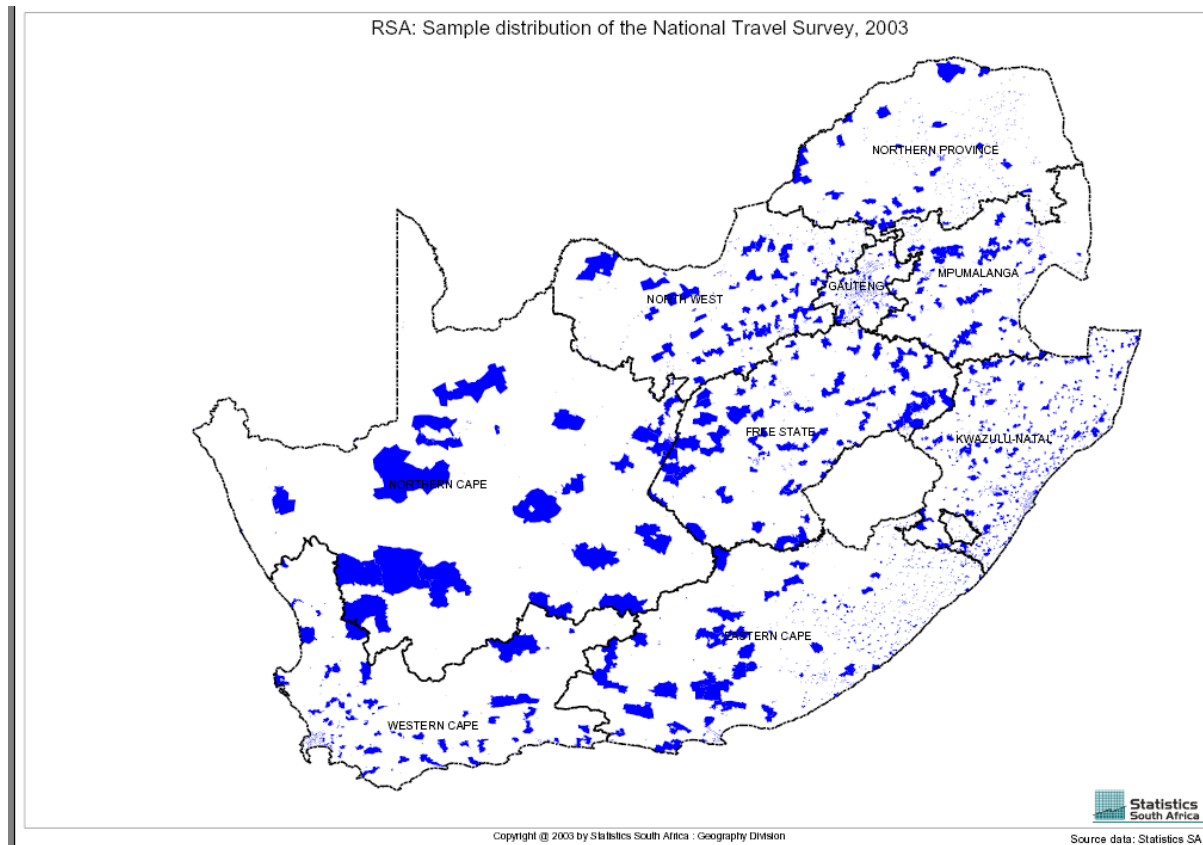


Figure 3. Distribution of sample.

7. THE CONTENTS OF THE NATIONAL TRAVEL SURVEY

The survey contains a number of modules which will be stored in separate data files but which can be linked in any statistical analysis. The sections which follow detail the broad contents of each of the modules.

7.1 Administrative Details

These details are generally confidential and are used for administrative purposes but included the number of households on any stand, the address of the sampled household, the date and number of calls to those households, the date of interview, interview details and other details relating to the back-checking.

7.2 Household Structure and Socio-Economic Information

This part of the questionnaire contained information about the type of dwellings occupied by the household, the transport problems experienced by the household and the walking times from the dwelling to the nearest transport facilities such as train stations, bus stops and taxi ranks. In this section, there was also a question about travel times and modes to facilities such as shops, medical services and police stations. Details about monthly household expenditure on public transport, total household income and car ownership were collected in the household section.

7.3 Information about all members of each household

It was essential to collect information about the gender, age and education status of each person and whether they had any disabilities which would impact on their travel and travel habits. All household members were questioned about their travel to activities such as work, school and shopping on the previous day. Information was also collected about holiday trips undertaken in the past seven days and about the use of various public transport modes in the last seven days.

7.4 Learner information

For those members of the households attending educational institutions, the survey ascertained the type and location of educational institution attended and the travel times, main modes and costs by each individual to the institution in question.

7.5 Work-related travel information

The work trip is a significant input to transport planning in the RSA. For this reason, detailed information was obtained about worker travel characteristics. Accordingly, for each worker, the survey obtained the individual's occupation, industry of employment, location of work and income from employment. In addition on the travel side, the survey ascertained the extent and quantum of travel allowances, business trips, the modes used to travel to work, the frequency of work trips and the travel times and costs.

7.6 Attitudes towards travel

A specific module was devoted to attitudes towards travel and travel modes. The attitudinal section was concerned with the use of transport services, the reasons for non-use of specific modes, the problems experienced in day-to-day transport and the level of satisfaction with transport services and their attributes. These covered attributes such as travel times and costs, safety and security and various other aspects of transport such as the behaviour of drivers, the condition of vehicles and roads and so on.

8. SEGMENTATION OF NATIONAL TRAVEL SURVEY INFORMATION

As has been intimated previously, the travel survey information will be available to provinces and municipalities during the course of 2004. Geographic analysis which will be permitted will include analysis at national, provincial, and district level. Within the districts, certain analysis at municipal and/or TA zone level will not be appropriate, and segmentation into different population groups and income categories will not be advisable because of the relatively small sample in each TA zone. On a national, provincial or district level, however, the data can also be used for analysis within and between various segments, including income groups, age groups, genders and education categories. Likewise, urban and rural groupings can be used.

It is stressed, however, that the sample is not sufficiently large for the data to be used for segments such as income groups within the analysis zones.

9. USES OF THE NTS DATA IN SOUTH AFRICA

The NTS feasibility and scoping study and results from international applications of travel surveys indicate that there are a number of research and planning needs that can be satisfied by a NTS.

At the national level, the following are some of the uses which will be served by a NTS:

- policy targets, for example modal shares, may be benchmarked and/or updated to ascertain trends once the surveys move into their second, third and subsequent cycles;
- gaps between international and RSA performance indicators can be identified as well as provincial and regional differences in the performance of transport systems;
- customer satisfaction and concerns about transport can be monitored, particularly relating to issues such as safety, security and reliability;
- one of the most important uses will be the tracking of car ownership and use because of its impact on congestion, energy consumption and attendant environmental issues such as air pollution, noise and road accidents; and
- the NTS can be used to quantify the extent of and changes in transport for the purposes of periodic migration, domestic tourism and business travel.

Provinces are also required to monitor the performance of their transport systems and report on KPI's to the Minister of Transport. The provinces are responsible for the co-ordination of transport and for evaluating the comparative performance of the main transport or planning authorities in the province. Accordingly, the main use by provinces will be to monitor changes in trip purposes, the frequency of trips and trip length or duration. At provincial level, it will be important to assess the extent of weekly and other periodic migration between urban and rural areas and into neighbouring provinces. This will assist with cross-border permit applications.

Municipal government will be concerned with the same general indicators as national and provincial government. In municipal areas, however, a most important use will be to assess the ongoing transport response to spatial and/or land use changes within the municipality.

Specifically, examples will include the following:

- proximity to stations, bus stops and other transport services;
- proximity to activities and attractions such as work places, schools and shops; and
- tracking market segment changes and the impact of income changes on the broad demand for travel and on the spatial patterns of trip-making and travel mode choices.

The NTS data will enable municipalities to check and verify Current Public Transport Record (CPTR) counts of passengers.

For rural spheres of government, (many districts) one of the main uses of the NTS will be for monitoring KPI's.

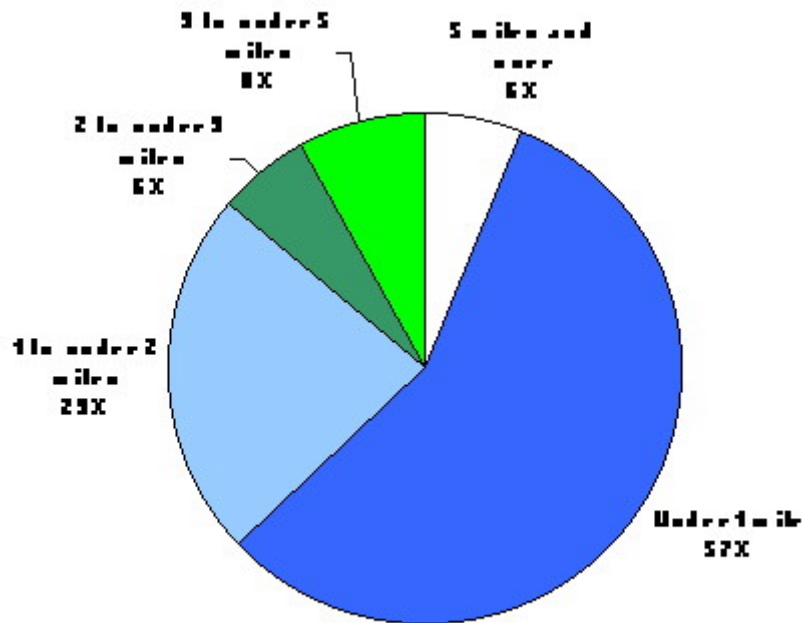
In this respect, the customer-based KPI's are particularly significant including:

- the average travel times to work and other attractions, particularly schools, shops and municipal offices;
- the percentage of households walking and using public transport to work;
- the percentage of rural people living within 15 minutes of access to regular public transport services; and
- the percentage of households spending more than 10 per cent of disposable income on transport.

10. INTERNATIONAL EXAMPLES OF THE USE OF TRAVEL SURVEY INFORMATION

The uses of travel survey information can be illustrated by reference to examples of the use of NTS information in the United Kingdom.

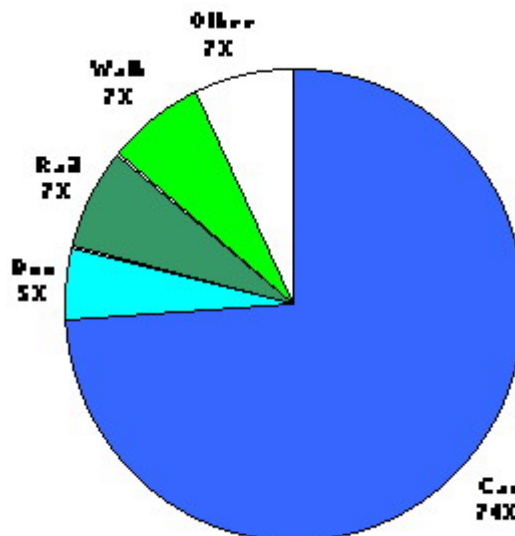
Figure 4 shows travel distances to school for children under the age of 11 in Britain. It is evident that the majority of trips made by the young children are shorter than a mile and that only a very small proportion are longer than 5 miles.



(Source: <http://www.transtat.dft.gov.uk/facts/ntsfacts/travsci/school01.htm>)

Figure 4. Length of school trips made by children 5-10 years.

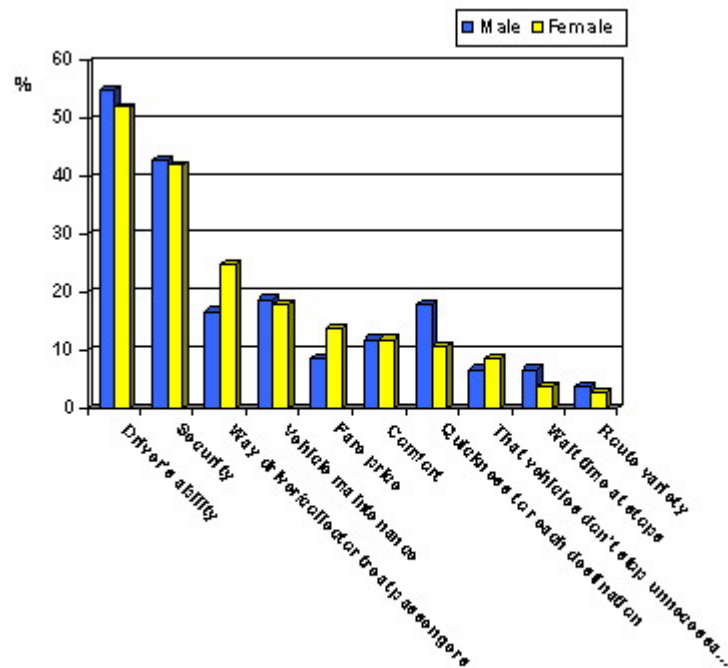
Figure 5 indicates that 74 per cent of males in Britain, where most people have access to regular public transport services, usually travel to work by car.



Source: <http://www.transtat.dft.gov.uk/facts/ntsfacts/trawork/trawork.htm>

Figure 5. Usual mode to work by males in Britain.

Interesting results from a Household Survey that was undertaken in Lima in 1997, are shown in Figure 6. It shows that respondents regarded driver's ability and security as the two most important aspects of public transport.



Source: Evaluation of urban transport in metropolitan Lima – Household survey Dec. 1997
http://www.worldbank.org/gender/transport/Grants___Pilots/PERU1_G_P/EncuestaAPOYO.pdf

Figure 6. Important aspects of public transport.

11. CONCLUSION

The content and format of the questionnaire was finalised after a rigorous process which involved behind-the-glass testing, three pilot tests and evaluation by stakeholders and survey experts. The fieldwork has been completed on time and within budget and the NDOT has confidence that the first National Travel Survey will provide information which will give great value to all organs of State with transport responsibilities.

12. REFERENCES

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