

# ANALYSING NHTS ON PUBLIC TRANSPORT ASPECTS

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## ABSTRACT

Last year, Statistics South Africa has reported on the National Household Travel Survey (NHTS) for 2020, with an overview of transport aspects just prior to the Corona restrictions (the 'old-normal'). In this paper, the results for public transport and its trend changes compared to the previous NHTS reports from 2013 and 2003 are analysed.

Public transport modal split has declined somewhat for most trip purposes (education, work, and other), despite the transportation policy objectives to promote public transport. However, absolute passenger volumes seem fairly stable, due to increase of population and economic growth.

Within public transport, the mode share of train has reduced greatly due to the deterioration of Metrorail services. Also, the bus share has reduced somewhat despite the introduction of BRT systems. Much of these passenger volumes have transferred to minibus-taxi and private car. This has led to an increase of minibus-taxi use, although transportation planning hardly caters for this mode of transport.

The NHTS has also analysed the 'dissatisfiers' for different public transport modes. Based on this, several recommendations are given for public transport policy implementation.

## 1. INTRODUCTION

### 1.1 Background

In the last decades, transportation policy has intended to grow the use of public transport (PT) by introducing Integrated Public Transport Network (IPTN) plans with modernised Metrorail services and new BRT infrastructure and services, although implementation was slower than originally planned for.

The effectiveness of this policy could be measured by the use of public transport, both in absolute volumes and relative modal split. The development over-time of modal split of PT, and the mode share of the PT modes train, bus and minibus-taxi, is presented in successive National Household Travel Surveys (NHTS).

### 1.2 Objective of This Paper

The objective of this paper is to analyse the trend changes in use of PT over the last decades, using the NHTS reports from 2003, 2013 and 2020 (section 2).

The analyses in this paper will concentrate on the 3 main travel modes: walking, car (driver and passenger) and PT. This paper excludes the results for cycling, motorcycle, metered-

taxi / e-hailing, animal-driven, and other modes (each mostly smaller than 1%); therefore, the presented percentages will not always add up to 100%.

The main focus of this paper is analysing the use of public transport as combined mode, as well as the modal share between train, bus and minibus-taxi (section 3).

The NHTS includes analyses on the perceived quality of the PT modes. Analysing these dissatisfiers (section 4) can give an indication where the PT systems currently fall short.

Based on these findings, this paper concludes with several recommendations how to increase the use of PT (section 5); these could be considered in future PT policies.

## **2. NATIONAL HOUSEHOLD TRAVEL SURVEY**

The National Department of Transport (NDoT) has the intention to survey the transport situation, as a National Household Travel Survey (NHTS), on a 5-year basis.

Many metropolitan municipalities are conducting their own Household Travel Surveys, but these have different questionnaires, not always comparable, and therefore not analysed in this paper.

### 2.1 Historic Overview

The first NHTS was done under responsibility of NDoT and surveyed many household travel aspects in 2003 (NDoT, 2005).

Before that time, some transport surveys were conducted by Statistics South Africa in the October Household Surveys (OHS). The OHS of 1996 and 1997 had conducted similar surveys for work-related trips (DBSA, 2007), not for other trip purposes.

Despite the intention to do the NHTS on a 5-year basis, the next survey was conducted in 2013 and was reported under responsibility of Statistics South Africa (StatsSA, 2014). Few questions were updated but the results were mostly comparable with the previous survey.

Early 2020 a next NHTS survey was conducted (StatsSA, 2021). This survey was finalised just before the Corona lockdown and therefore hardly impacted by its travel restrictions, although some final control-surveys had to be cancelled. The 2020 NHTS still reflects the transport behaviour of the 'old normal' situation and is therefore well comparable with the previous surveys.

The NHTS has surveyed a sample of almost half a percent of all South African households (including all persons in the household), proportionally spread over provinces, geographic areas, race groups, income levels, etc.

The NHTS makes distinction between education trips, work trips and a range of other trips. Unfortunately, the questions between the different trip purposes are different and therefore difficult comparable between the trip purposes. For that reason, this paper will mostly focus on work and education trips, which form roughly 70% of all mobility, and 80% of the PT mobility.

## 2.2 Some Remarks on Train Trips

Commuter trains are only available in Cape Town, Gauteng, Durban and both Eastern Cape metros. However, the NHTS has the train mode share as a national and provincial value, obviously impacted by the vast amount of commuters that do not have a train service available. The train mode share values are much higher for Western Cape and Gauteng provinces (where the rail network covers a fair portion of the metropolitan areas), and less high in KwaZulu-Natal and Eastern Cape (with the rail network covering a smaller portion of their metropolitan areas, and the not-serviced areas being relatively larger). For that reason, the data for other provinces are not assessed while analysing results on train transport.

The use of Gautrain would be too small to be recognised in the train share of the survey. Gautrain serves less than 1% of all PT trips in Gauteng, less than a quarter % of all PT trips in South Africa.

Similar can be stated for Long-Distance trains. These are not used for commuting to work or school, only for other social and leisure trip purposes. However, these passenger volumes are very low.

So, where the NHTS speaks about 'train', it is predominantly PRASA Metrorail.

## 2.3 General Analyses from NHTS

The NHTS questionnaires have asked about education and work trips over the preceding week. 75-80% of the population has made a trip in the past week. This has been fairly constant over-time. On a single average workday 70-75% of the population makes a trip; on weekend days this is half at approximately 35%.

This means that 25-30% of the population stays at home on a daily basis. Reasons were given as: no need to make a trip, or too old / young to make a trip. However, 10% of the people that did not make a trip, mentioned financial reasons (mainly youth and adults, equal in urban and rural areas); no other specific service reasons were mentioned. This aligns with the sentiment that many people spend a relatively high portion of their household income on (public) transport. This would limit the economic and social inclusion of those households.

## **3. PUBLIC TRANSPORT MODAL SPLIT**

Of all trips made by all modes, roughly 40% is for education, 30% for work purposes, 15% visiting shops and facilities, and 15% social and leisure. For each of these trip purposes, the modal split of PT would differ.

### 3.1 Education Trips

Approximately 30% of the population follows education. In this section, a split is made between pre-, primary and secondary education learners (90% of all education trips), and higher education students (10%). This is done as higher education students are often over 18 years old, with more transport options available.

### 3.1.1 Modal Split for Learners

School trips are mostly made on a daily basis: 99% of pre-, primary and secondary school learners attend school 5 days per week.

Currently, learners mostly walk to school (62%, pre-school somewhat lower), are dropped off / picked-up by car (16%; pre-school somewhat higher), or travel by PT including scholar transport (20%). The share of walking is somewhat higher in rural areas compared to urban areas, probably as rural households generally have less household income to spend on transport and public transport being less available in rural areas.

Over-time, the share of walking has reduced by -5 %-points compared to 2013, and another -10 %-points since 2003; see Figure 1. This is replaced by car and PT.

Within the PT modes, the use of train has dropped from 1% in 2003 and 2013, to almost 0% in 2020. Bus use is at 6%, minibus-taxi at 14% (increased from 8% in 2003 and 13% in 2013); see Figure 2.

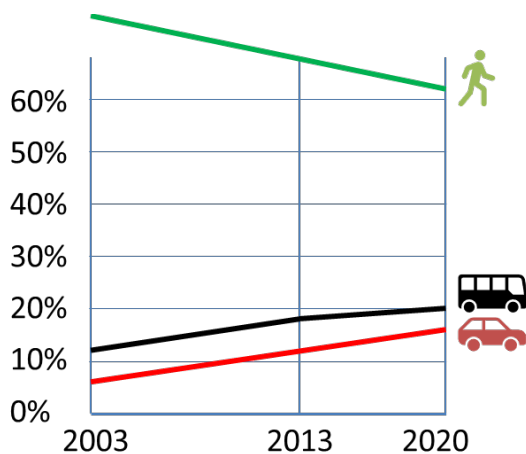


Figure 1: Modal Split % – Learners

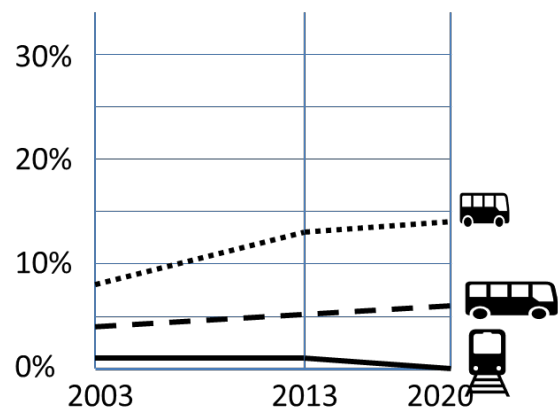


Figure 2: PT Mode Share % – Learners

Often walking is found acceptable, as more than 75% of learners indicate their school is close enough. In the NHTS, special mentioning is made for long walking trips to school: over 25% of learners walk more than 30 minutes to school, and 5% even more than 1 hour. In conjunction, 11% of learners mentioned that they walked as PT was too expensive, and some 5% mentioned that PT was not available in some way or another, both more so the case in rural areas. This indicates a potential PT market, as provincial Departments of Transport and Education are obliged to provide transport for learners who need to travel more than 3 km for their school trip.

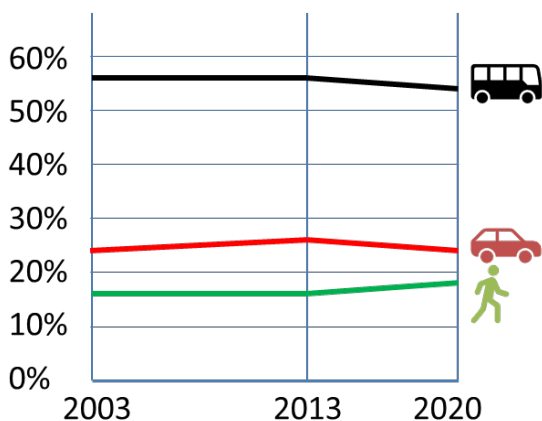
Of scholar transport (used by some 20% of the scholars), around 80% is privately organised and 20% arranged by government: Northern Cape and Eastern Cape provinces have an above average share of governmental scholar transport.

### 3.1.2 Modal Split for Students

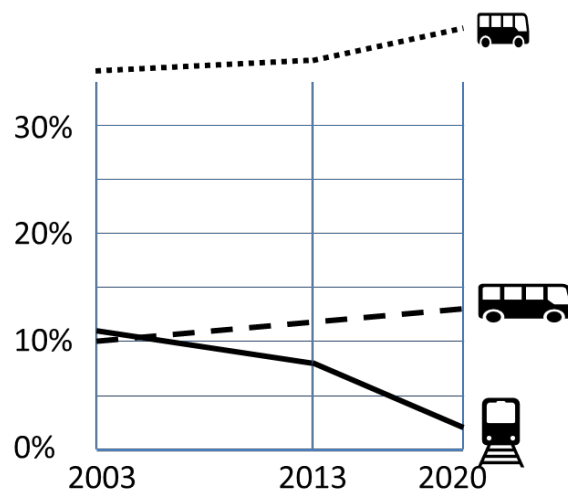
Approximately 65% of the tertiary education and college students attend education every day with the remainder 35% attending 1 to 4 days a week or distant learning.

Currently, students travel mostly by PT (55%), car (24%), and walking (19%); see Figure 3. This has changed little since 2003 and 2013.

Within the PT modes, the share of train reduced significantly from 11% in 2003, and 8% in 2013, to 2% in 2020, equally replaced by minibus-taxi, bus and walking; see Figure 4.



**Figure 3: Modal Split % – Students**



**Figure 4: PT Mode Share % – Students**

### 3.1.3 Travel Time

Students' travel times are longer compared to learners, as distances are longer: 35% of students and less than 10% of learners travel longer than 1 hour.

Over-time, the trip time for all education trips has increased a little per mode of transport. This is also indicated by the earlier time that learners and students leave home to go to their educational institution. The trip times by train have increased significantly, a sign of the vast deterioration of train transport, also indicated by the significant reduction of its mode share.

Apart from the long travel times by PT, the majority of PT users (95%) experience less than 15min walk to the PT stop, less than 15min waiting time, and less than 15min walk from the PT stop to school. This indicates that, once public / scholar transport is provided, its service quality aspects are adequate. However, as stated above, a portion of learners walk to school because PT is not or poorly available. For them, PT needs to be improved.

### 3.1.4 Travel Costs

Since 2013 (no data available for 2003), the costs for transport to education institutions have increased by some 30% as average over the modes of travel, excluding walking that generally does not incur costs. This is lower than inflation / CPI over the same period (at approximately +50%), so in real terms the cost for travel to education has decreased somewhat. However, as the portion of learners using car or PT has increased, for some the travel costs have increased significantly. As mentioned above, for some learners PT was too expensive and they opted to walk.

## 3.2 Work Trips

In addition to the NHTS reports, the OHS of 1996 and 1997 have surveyed work-related trips in a similar way (DBSA, 2007), and these results (averaged over both surveys) are used in the trend analysis in this section.

Between 25 and 30% of the population works. The majority of workers (>85%) go to work 5 or more days per week.

### 3.2.1 Modal Split for Workers

Currently, workers commute mostly by car (44%), by PT (35%), and walking (20%). In urban areas, the share of car use is higher; in rural areas, the share of walking is much higher; but in both areas, the use of PT is fairly similar.

Since 1996/97 the modal split of car use has increased by some +15 %-points, while PT use has decreased -10 %-points and walking -5 %-points. In 1996/97 and 2003, PT was the dominant mode for workers, in 2013 car and PT were equally used, and now the car is dominant; see Figure 5.

Within the PT modes, the share of train use reduced significantly from 6% in 1996/97 and 2003, and 5% in 2013, to 1% in 2020, a sign of the vast deterioration of train services. This is even more prominent in provinces where commuter rail is (or rather: was) widely available: Western Cape and Gauteng, and somewhat less widely available in KwaZulu-Natal and Eastern Cape.

Also, the bus share has reduced, despite the introduction of BRT in metropolitan areas. Both developments resulted in a steady increase of minibus-taxi use; see Figure 6.

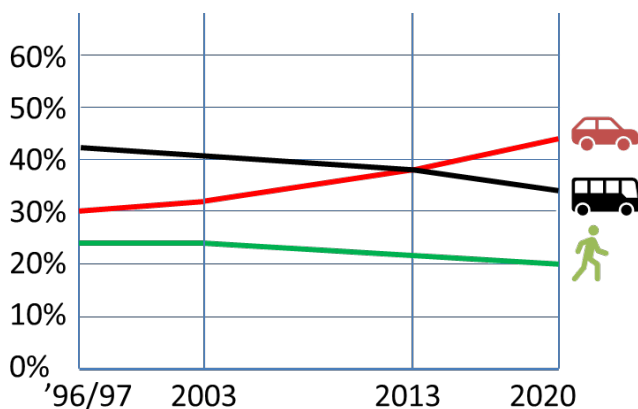


Figure 5: Modal Split % – Workers

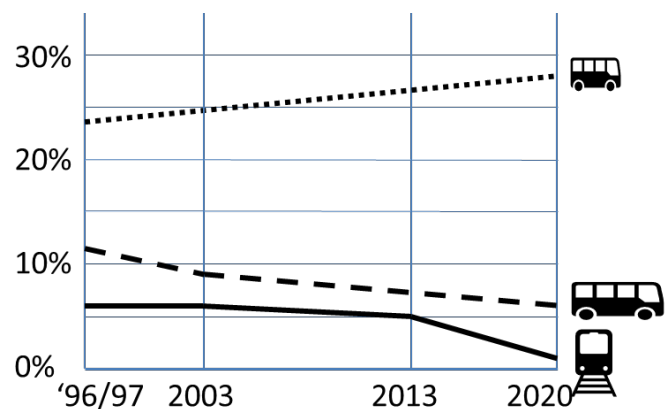


Figure 6: PT Mode Share % – Workers

### 3.2.2 Travel Time

25% of workers leave home before 6:00 AM. Interestingly, there is a difference between the southwestern provinces with 15-20% leaving before 6AM, and the northeastern provinces with 25-35% (similar was found for early school trips). This could partly be explained by the sunrise times, where in the eastern part of the country, life generally starts earlier.

However, in transport planning and surveys, the morning peak is often considered to start at 6AM. This would mean that a significant portion of commuter trips is not assessed, and possibly poorly planned for. However, the minibus-taxi industry would know its market and may accommodate those early trips.

Over-time commuter trips have started somewhat earlier and the total trip time to work has increased (on average some 15 minutes longer in 2020 compared to 2003), mainly due to increased congestion impacting travel times for car and road-based PT. The trip times by train would not be affected by road congestion, but nevertheless have increased significantly (more than 30 minutes longer), a sign of the vast deterioration of train transport, also indicated by the significant reduction of its mode share.

The mean travel times for workers are approximately 15 minutes longer than for learners, even though workers mostly use a faster mode of transport (car and PT). This is an indication of the poor alignment of residential and working areas. This is still a legacy of Apartheid planning, and not really amended in recent decades.

Apart from the long travel times by PT, most PT users (90%) experience less than 15min walk to the PT stop, less than 15min waiting time, and less than 15min walk from the PT stop to their workplace. This indicates that those service quality aspects of commuter PT are fairly adequate. However, the situation for train users is far worse.

### **3.2.3 Travel Costs**

Since 2013, the costs for commuter transport have increased by 80% on average; the increase was even higher for the main modes of travel: car drivers and minibus-taxi: +90%. This is much higher than inflation / CPI at +50% over the same period, so in real terms the cost of commuter travel has increased by some +5% annually: a real burden on workers' household budgets.

### **3.3 Other Trips**

The NHTS questionnaire was mainly set up to investigate education and work trips made in the preceding week. As these trips are generally made on a daily basis, it gives a good overview of such trips on an average workday. Other trip purposes are made less frequent, and the questionnaire was adjusted to include as much information as possible. Therefore, direct comparison is not possible.

Also, between the different NHTS reports, the scope of 'other' trip purposes (business, day trips, overnight trips, visiting shops and facilities) has somewhat changed, and direct comparison was not always possible. However, over-time one can generally see a slight shift from walking and PT use to car use.

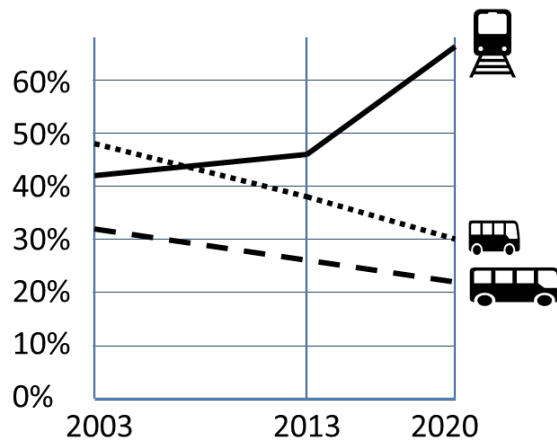
Within the modes of PT, there is some slight fluctuation for bus and minibus-taxi use, and train use generally decreased significantly.

## **4. QUALITY ASSESSMENT OF PT**

Apart from the modal split for different modes and the PT mode shares, the NHTS has surveyed the percentage of people that are dissatisfied about certain quality aspects. Although this is a subjective valuation, it gives a good indication of the perceived quality of different PT modes, as well as potential improvements required (next section).

The main factor that influences the household choice of transport mode is the cost of transport at 31%, up from 26% in 2013. Travel time was the main factor in 2013 at 33%, now at 23%. Flexibility and reliability have become more important at 23% combined, up from 14%, possibly as a response to the deterioration of train service and increased road congestion.

The general dissatisfaction with the train service overall is 69% (worsened from 47% in 2013, and 42% in 2003). This is much worse than the valuation of bus service with an overall dissatisfaction at 23% (improved from 27% in 2013, and 32% in 2003) and minibus-taxi service at 30% (improved from 39% in 2013, and 48% in 2003); see Figure 7.



**Figure 7: Dissatisfaction with PT Modes**

#### 4.1 Dissatisfaction with Train Service

The main reason for people not using the train as mode of transport was because the train was not available; this would be obvious as the majority of population lives in areas where no train service is provided. However, in 2020 compared to 2013, also in the Western Cape and Gauteng Provinces, an increasing number of people mentioned that a train service was not available. This would be caused by the fact that some corridors were out of service due to vandalism (e.g. Central Lines in Cape Town, Mabopane – Pretoria, and others).

The next most mentioned reason is related to service levels. In the NHTS 2020, train quality aspects are almost all valued negatively by the majority of people, and degraded significantly compared to the previous NHTS 2013 and 2003.

The most negatively valued aspects are crowding, waiting time and frequency, all at more than 80% dissatisfaction (worsened from typically 50% in 2013 and 2003 – at that time also the most negatively valued aspects); the valuation of these aspects in Gauteng and Western Cape (the 2 provinces with most train use) is even worse.

Onderwater (2021) has analysed the actual train service aspects over the last 12 years (from PRASA’s Annual Reports) and has concluded that, although objectively most service aspect remained fairly similar, especially ‘reliability’ has declined significantly which indeed would have impacted on perceived waiting time, frequency and crowding – the most dissatisfying service aspects. Also, the perception of all service aspects combined in PRASA’s Customer Satisfaction, has declined significantly.

The single most positive aspect related to train service is fare price, where merely 10% of people are dissatisfied (15% in 2013, and 23% in 2003). Train is indeed by far the cheapest mode of transport, fares have not increased in the last 5 years, and possibly fare evasion rife. The second best aspect is safety from accidents, at almost 40% dissatisfaction (although worsened from 30% in 2013, and 25% in 2003).

#### 4.2 Dissatisfaction with Bus Service

The most negatively valued aspects for bus transport are the facilities at the bus stop at 60% dissatisfaction and associated security aspects both at bus stops and walking to/from the bus stop (30-35%). Crowding in the bus scores 41% and frequency off-peak at 34% dissatisfaction.



Positive aspects for bus transport are the behaviour of bus drivers, fare price, safety and security on the bus, all around 20% dissatisfaction, and all improved since 2013 and 2003. Here, the introduction of BRT in some metros might have played a positive role.

#### 4.3 Dissatisfaction with Minibus-Taxi Service

The most negatively valued aspects for minibus-taxis are the facilities at the taxi ranks at 56% dissatisfaction, as well as fares, driver behaviour, safety from accidents, and road-worthiness of vehicles, all between 35 and 40% dissatisfaction. Most of these aspects have improved since 2013 and 2003. The safety concerns, including driver behaviour and vehicle quality were more prevalent in Gauteng and Western Cape at 40-50% dissatisfaction.

Positive aspects for minibus-taxis are travel time, access, and peak frequency of the service, as well as security and crowding in the vehicles, all between 20 and 30% dissatisfaction. Most of these aspects have improved since 2013 and 2003.

### **5. POSSIBLE PT IMPROVEMENTS**

The decline of PT modal split (section 3), despite the urge to promote PT, requires to look where the PT policy could be enhanced. The dissatisfaction levels (section 4) give an indication where the different PT services could be improved.

#### 5.1 Restore Train Service

In the last years, Metrorail services have deteriorated greatly, despite PRASA's Modernisation plans. From the dissatisfaction analyses, train service should improve overall on all aspects, and PRASA's current revitalisation and modernisation plans would bring the service quality back to previous levels and better.

Considering the previous dissatisfaction levels, crowding, waiting time and service frequency needed to be improved the most, which is foreseen with additional rolling stock capacity and improved signalling, catering for higher frequencies.

However, it is recommended to re-assess the PRASA rail network, as possibly not all corridors need to be brought back in service.

#### 5.2 IPTN Planning to be More Integrated

Despite the introduction of BRT as trunk routes in the IPTN planning, the mode share of bus is slowly declining. The original IPTN plans even tried to phase-out minibus-taxis, or at best assign them the role of feeder services only. Despite that, the mode share of minibus-taxi has increased and currently catering for 80% of all PT trips.

It would be fair to redesign the IPTN policy (networks, infrastructure use, and funding) to have the minibus-taxi benefiting as well. The PT network assessment should be made integral, and the best mode for the corridor be determined: at some corridors, rail could be replaced by bus or minibus-taxi, and BRT infrastructure accessed by minibus-taxis.

### 5.3 Minibus-Taxi Fares and Subsidies

Train and bus fares are found to be acceptable; those systems are mostly subsidised, keeping the fares low. Minibus-taxis don't receive operational subsidies and subsequently fares are more expensive. This is also assessed as the most important service-related reason that withholds people from making trips, and for learners walking long distances to school. In combination with long travel distances (due to low densities and Apartheid planning legacy) this would limit people's economic and social inclusion.

For that reason, one could consider subsidising minibus-taxi services. Also, subsidising the minibus-taxi industry might provide opportunities to further upgrade other service aspects by contracts or service level agreements.

Recently, there has been a discussion on subsidising the taxi industry (Competition Commission, 2020), awaiting decisions and implementation by NDoT.

### 5.4 Improve Security at Bus Stops and Taxi Ranks

For bus and minibus-taxi services, the facilities at bus stops and taxi ranks are perceived to be the biggest issue, as well as security aspects at and to/from bus stops and taxi ranks. Here the Transport Authorities and Municipalities could make an impact by improving those facilities as well as the general public realm.

### 5.5 Improve Minibus-Taxi Safety Aspects

Another serious issue at minibus-taxi services is the safety of the service, in combination with driver behaviour and poor vehicle quality. This could be incentivised by subsidies and additional contractual requirements. As an example, eThekweni has introduced a quality label with the Moja Cruise programme.

### 5.6 Provide More Scholar Transport

Roughly 15% of the learners indicated that their walking trip to school was too long or too expensive, especially in rural areas. Apart from re-assessing the density and location of rural schools, it would urge for provision of scholar transport in those areas, or even provide better public transport for all of the rural community.

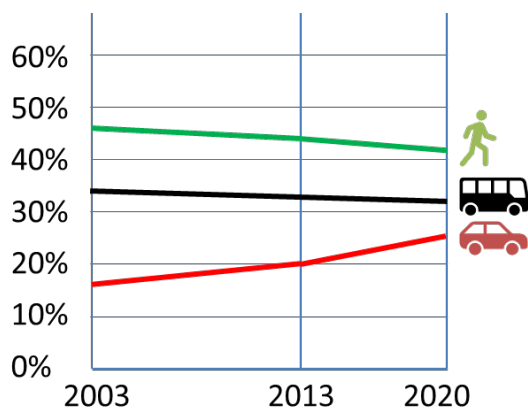
## **6. CONCLUSIONS AND RECOMMENDATIONS**

### 6.1 Summary of the State of PT

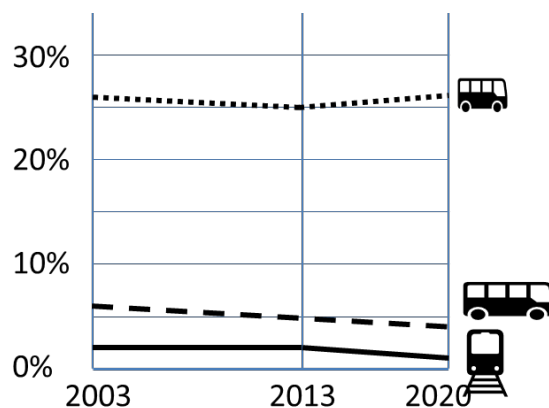
Overall, considering all trip purposes, the modal split for PT and walking came down slightly, both at some -5%-points in the last 15-20 years, and private car up at +10%-points, indicating a slow shift from both walking and PT to car use; see Figure 8.

Within the PT modes, the use of train has reduced significantly due to the deterioration of Metrorail services, shifting towards minibus-taxi; see Figure 9. In 2003 and 2013 around 65% of all PT trips were made by minibus-taxi, by 2020 this has increased to 80%.

It would be interesting to see the impact of the emerging of e-hailing services (Uber, etc.) in recent years. However, this is not surveyed separately in the NHTS.



**Figure 8: Modal Split % – All trips**



**Figure 9: PT Mode Share % – All trips**

Given the recent growth of population at 1.5% annually, and the small decline in modal split of PT, it can be concluded that the absolute volume of PT passengers has remained fairly stable.

As the modal share of minibus-taxi has remained stable, it can be concluded that the absolute number of passengers traveling by minibus-taxi has increased. This would have resulted in more vehicles (owners, drivers, employment) and/or more efficient use of those vehicles (higher income, profits). However, since many provinces have a moratorium on issuing Operating Licenses, possibly more vehicles operate without license.

## 6.2 The Future of PT

In the next decade, the trend indicates that the modal split for PT would most likely further decline, but with increasing population (expected to grow at 1% annually), the absolute use of PT would remain fairly stable.

PT use could increase by further improvements of PT services: revitalisations of train services, more BRT, and improve the Integrated PT Networks, including all modes.

The travel situation in 2020/21 was disturbed due to the Corona lockdown restrictions, and PT use declined dramatically, both in absolute passenger volumes and in modal split (although available data is limited). It is anticipated that in the medium term, travel behaviour will return to a 'new normal'. A next NHTS survey to be conducted after 2025 would result in a next set of data that would be well comparable to the previous surveys.

## 6.3 Improve Next NHTS Surveys

It was originally planned to conduct the NHTS survey in a 5-year cycle. However, the recent surveys have a 10 and 7 year gap. It is recommended to increase this frequency for more accurate information and a more speedily response on mobility developments.

Unfortunately, the NHTS did not allow for more vigorous analyses of the other (business, social, facility) trips. This would limit the provision of sufficient quality level of service of public transport in off-peaks, as the data – and therefore the transport provision response – would focus on peak transport mainly.

## 7. REFERENCES

Competition Commission, 2020. *Land based public passenger transport, market inquiry*. Executive Summary of the Main report. Pretoria.

Development Bank of Southern Africa (DBSA), 2007. *Report on Trends in Passenger Transport in South Africa*. Midrand.

National Department of Transport (NDoT), 2005. *The First South African National Household Travel Survey (NHTS) 2003, Technical Report*. Pretoria.

Onderwater, P, 2021. *Planning and Elasticity Parameters for Train use – Learning from the Deterioration of PRASA Metrorail*. Southern Africa Transport Conference, Pretoria.

Statistics South Africa (StatsSA), 2014. *National Household Travel Survey (NHTS) 2013*. Statistical release P0320, Pretoria.

Statistics South Africa (StatsSA), 2021. *National Household Travel Survey (NHTS) 2020*. Statistical release P0320, Pretoria.