Will the Covid-19 pandemic lead to lasting changes in travel patterns?

Prof Christo Venter
Centre for Transport Development
University of Pretoria
christo.venter@up.ac.za

Dr Nicolaas Van Zyl
Centre for Transport Development
University of Pretoria
KvZ.BlueMind@outlook.com

Namatirai Cheure
Centre for Transport Development
University of Pretoria
namacheure@gmail.com

INTRODUCTION

The Covid-19 pandemic has had major impacts on all sectors of the South African economy. Like in the rest of world, transport has been severely affected by both demand- and supply-side impacts. On the demand-side, major shifts have occurred in people's work, shopping, and social activities, which in turn have led to changes in travel volumes and traffic patterns. Changing work patterns such as work from home (WFH), staggered working hours and retrenchments caused a reduction in the number of trips workers are making and their choice of travel mode.

Health regulations require public transport operators to restrict the occupancy levels of vehicles, further exacerbating financial distress among operators. Vandalism and theft of commuter rail infrastructure have decimated train services. These supply-side changes, coupled with commuters' concerns about hygiene on public transport, have led to shifts in public transport use that may affect its sustainability for years to come[1].

Civil engineers are grappling with what these changes mean for the future of the transport industry, and for society at large. A key question is which changes in demand and supply will persist, and whether a "new normal" will emerge that puts us on a fundamentally different trajectory than before the pandemic. It is still too early to answer these questions, but a better understanding of current behaviour changes can help point the way towards likely future trends.

This article explores some of these changes by examining the impacts of Covid-19 on work and travel patterns in Gauteng, based on a survey of more than 1 000 Gauteng residents, conducted in November 2020. The survey will be repeated in 2021 to track changes over time and will also be used to compare results across multiple cities in Australia and South America. The survey was funded by the BRT+ Centre of Excellence, which is financed by the Volvo Research and Educational Foundations (VREF).

At the time of the survey South Africa was on alert level 1, while infection numbers were relatively low and before the arrival of the second wave of infections.

THE SURVEY

The survey was conducted by a market research company, who used their consumer panel to recruit respondents for the online questionnaire. The sample was restricted to adults older than 18 years residing in Gauteng province (which includes the metropolitan areas of Johannesburg, Tshwane, and Ekurhuleni). The online recruitment under-sampled lower-income people, so it was supplemented by in-person recruitment undertaken at minibus-taxi ranks, bus stops and train stations. Potential respondents were randomly selected and provided with an internet link via a QR-code to self-complete the questionnaire on their cell phones. An incentive was provided in the form of a chance to win a small cash prize.

The final sample consisted of 1056 individuals, consisting of 48% high-income, 8% medium-income, and 33% low-income people. The gender distribution was balanced (52% females). About 67% of respondents were either exclusive or occasional car users (including e-hailing), with the rest either public transport users (19%), people who walked and cycled (5%), or people who did not currently travel (9%). To correct for the over-representation of high-income people in the sample, the results below are based on a weighting by income and age group to match the population of workers in Gauteng obtained from the 2013 National Household Travel Survey.

EFFECT OF COVID-19 ON TRAVEL PATTERNS

To track how travel volumes have changed during the pandemic, we used cell phone app data reported by Google and Apple's mobility reports. Figure 1 shows the trend in travel activity in Gauteng compared to a pre-Covid baseline[2]. At the height of alert level 5 in April 2020, driving decreased by more than 80%, after which it gradually rose again. By October 2020 (when the country was on the lowest alert level) car trips had recovered to normal levels, until the December holidays and the resurgent pandemic caused another drop-off.

This suggests that the reduction in overall travel activity was relatively short-lived, and that trip-making is quite resilient. However, people adapted to ongoing restrictions and workplace closures by changing the nature of their trips. Google's location-specific data show that throughout 2020, stays at residential locations remained above the baseline, while visits to work locations remained depressed. This is in line with continuing WFH practices. But reduced work travel was somewhat offset by rises in non-work trips, as illustrated by visits to grocery

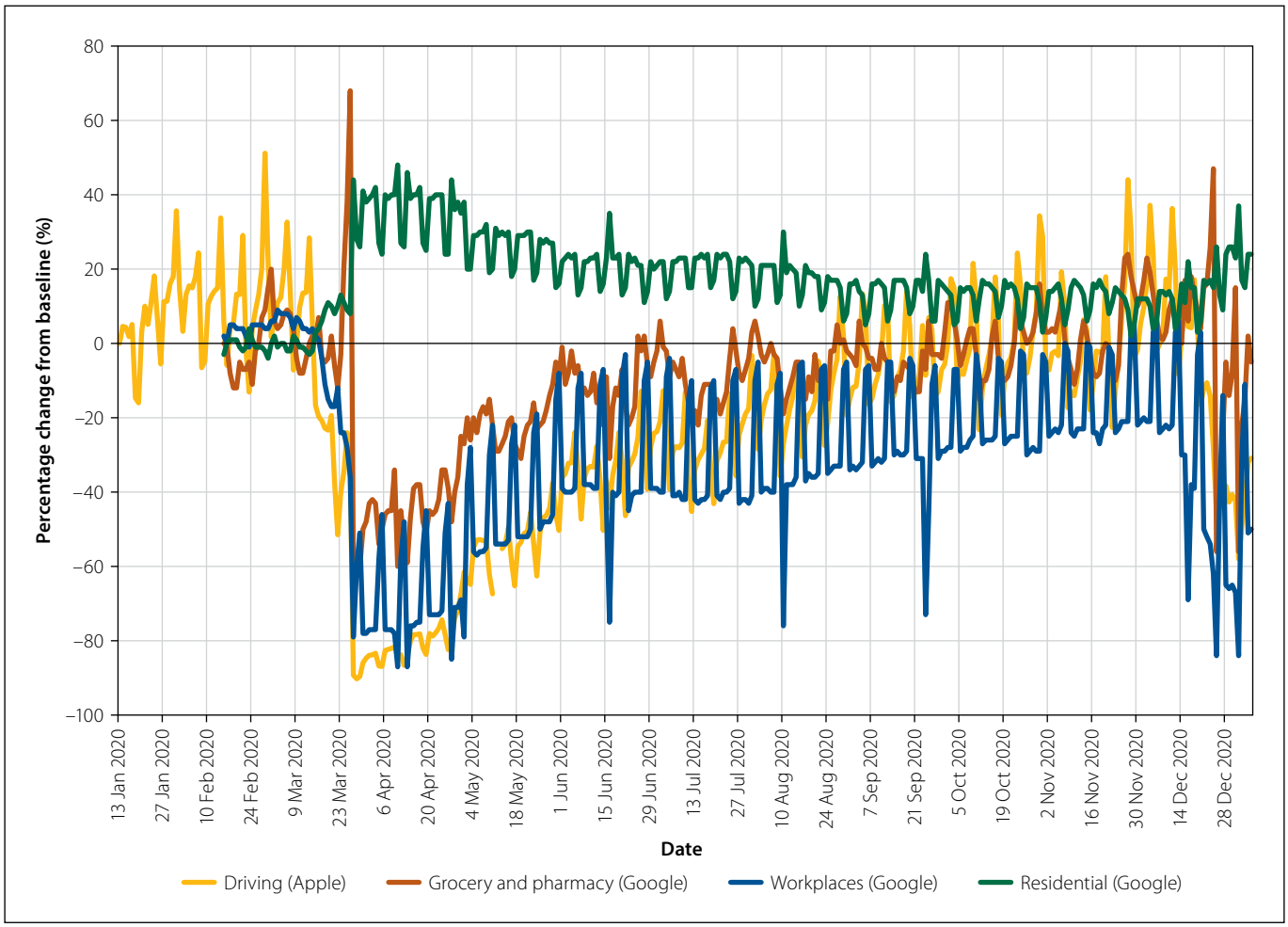

Figure 1 Changes in trip making in Gauteng during 2020 (Source: Adapted from Apple and Google mobility data)

stores and pharmacies which were consistently less depressed than work trips (Figure 1).

However, most people still perceived their travel to be less in November than before Covid-19. Figure 2 illustrates the percentage of respondents who indicated whether their weekly number of trips in the previous week either decreased, stayed the same, or increased compared to before the pandemic (labelled "past"), by mode.

Overall, four out of five people in the sample felt that their travel was still lower in November 2020 than before the pandemic. Perceptions around trip reduction differ markedly across modes, with car users far more likely to report a reduction in trips than public transport users. For instance, only 40% of Gautrain users and 51% of minibus-taxi users felt their number of trips were still below pre-Covid levels, compared to 87% of car and e-hailing users. One explanation for this could be that car users are mostly higher and medium income individuals who are more able to adapt to the pandemic by working from home. Detailed travel diaries are needed to gauge the true reduction in trip making over time.

With the country presently on a higher alert level and the future trajectory of the pandemic uncertain, can we say something about how these patterns might change in future? We asked respondents how they expect their travel to change

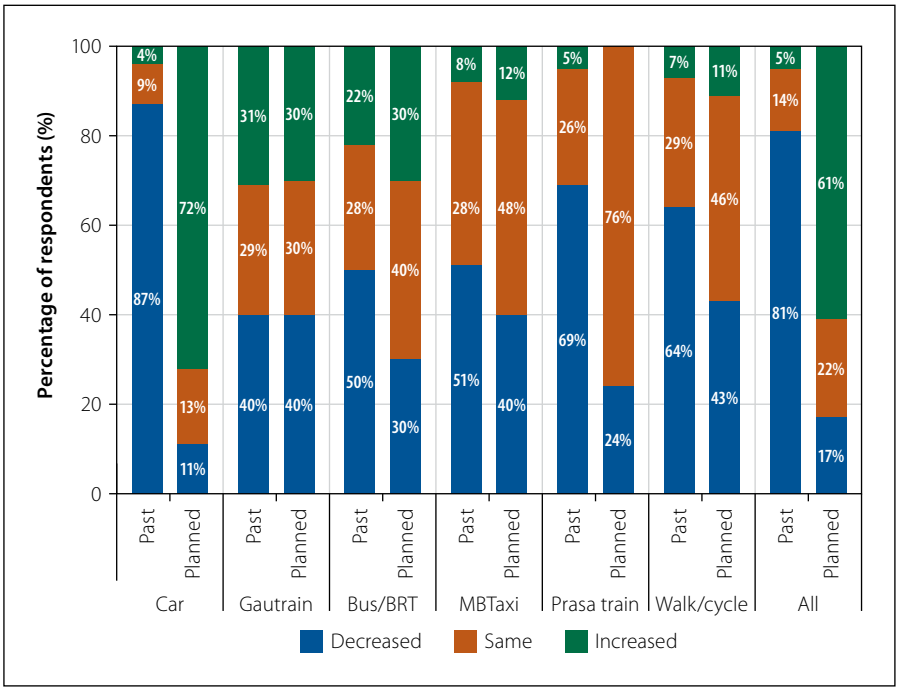

Figure 2 Percentage of respondents who indicated changes in the number of trips before lockdown compared to current travel (past) and expected in future when restrictions are eased (planned). Mode shown is the most commonly used mode per person.

once the Covid restrictions are eased, compared to their current travel (labelled "planned" on Figure 2). Car users foresee a much quicker recovery of demand, while public transport changes will largely continue on present trends. The exception is Prasa rail patronage, which is likely to decline further in line with the collapse in rail services. It is also notable that walking and cycling seem not to be making any gains in usage.

The noted reduction in work trips is due to two factors: increased working from home, and reduced employment and economic activity. Figure 3 shows how the work force has declined: since the start of the pandemic, the number of households with no workers increased by almost a quarter. Job losses have mostly affected the second and third worker in a household, while many households managed to retain at least one bread-winner in the workforce. More women than men lost their jobs: 35% of women in the sample said their employment status had been impacted by Covid-19, compared to only 11% of men. There has not been a marked shift from full-time to part-time work.

THE IMPACT OF WORKING FROM HOME

WFH remains a widespread practice. Figure 4 shows that most workers (60%) worked five days a week from anywhere, while just above 40% of workers worked from home five days a week. Recall that this was during a lull in new infections, suggesting that WFH has become at least a somewhat durable habit. Smaller numbers of people follow a hybrid working strategy, working from home only a few days a week and commuting the rest.

The extent to which workers have a choice about WFH might give some indication of the likelihood that they will continue doing so. Figure 5 shows that, of the 42% of workers who WFH, the majority of those who WFH do so by choice, while the rest were forced by their employer. People who do not WFH are evenly split between those who feel their job cannot be done from home, and those who elect not to work from home. Evidently the segment of the working population for whom WFH is an option is sizable.

Of course, the possibility of WFH varies by the type of occupation. Figure 6 shows that WFH is more concentrated

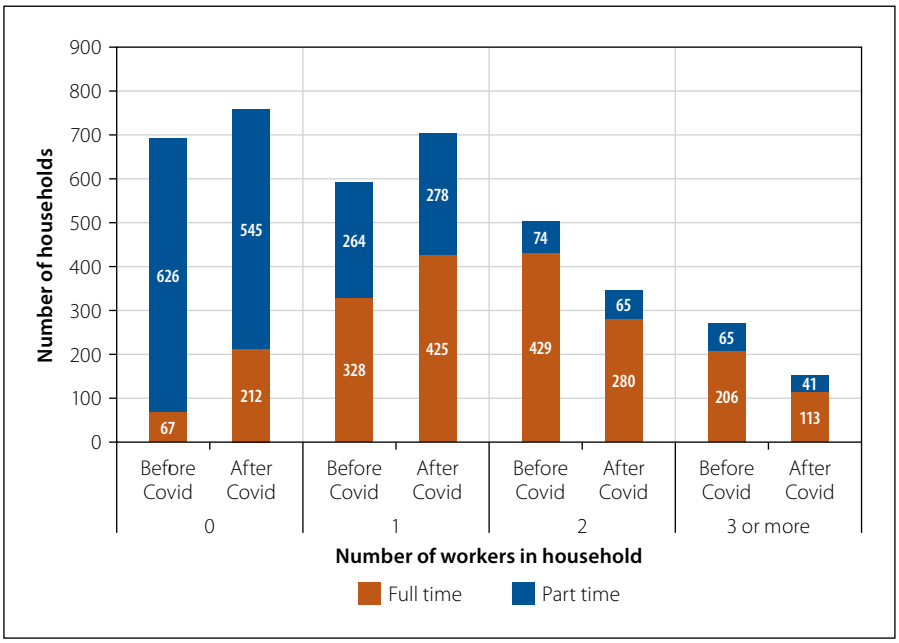

Figure 3 Number of workers per household, before and after start of Covid-19

Figure 4 Number of days worked per week anywhere and worked from home in November

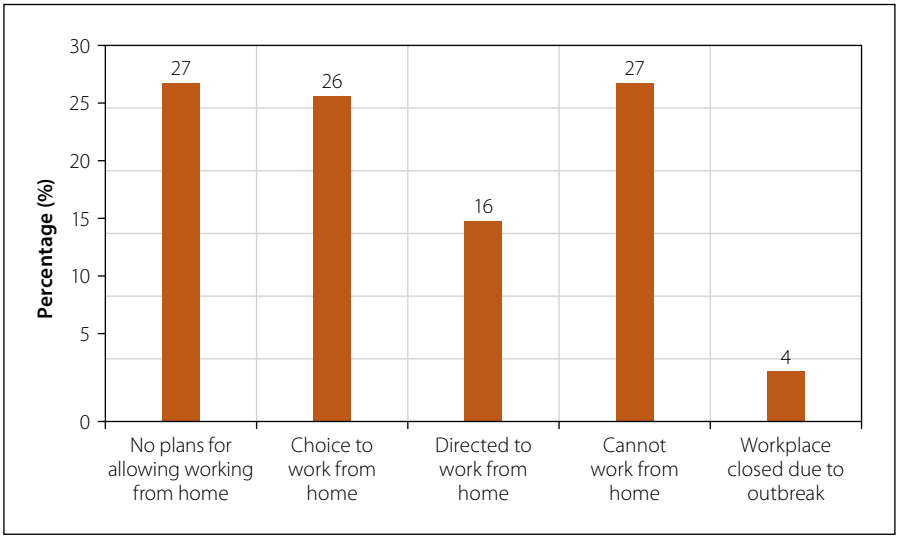

Figure 5 Work from home policy of employers (% of employed respondents)

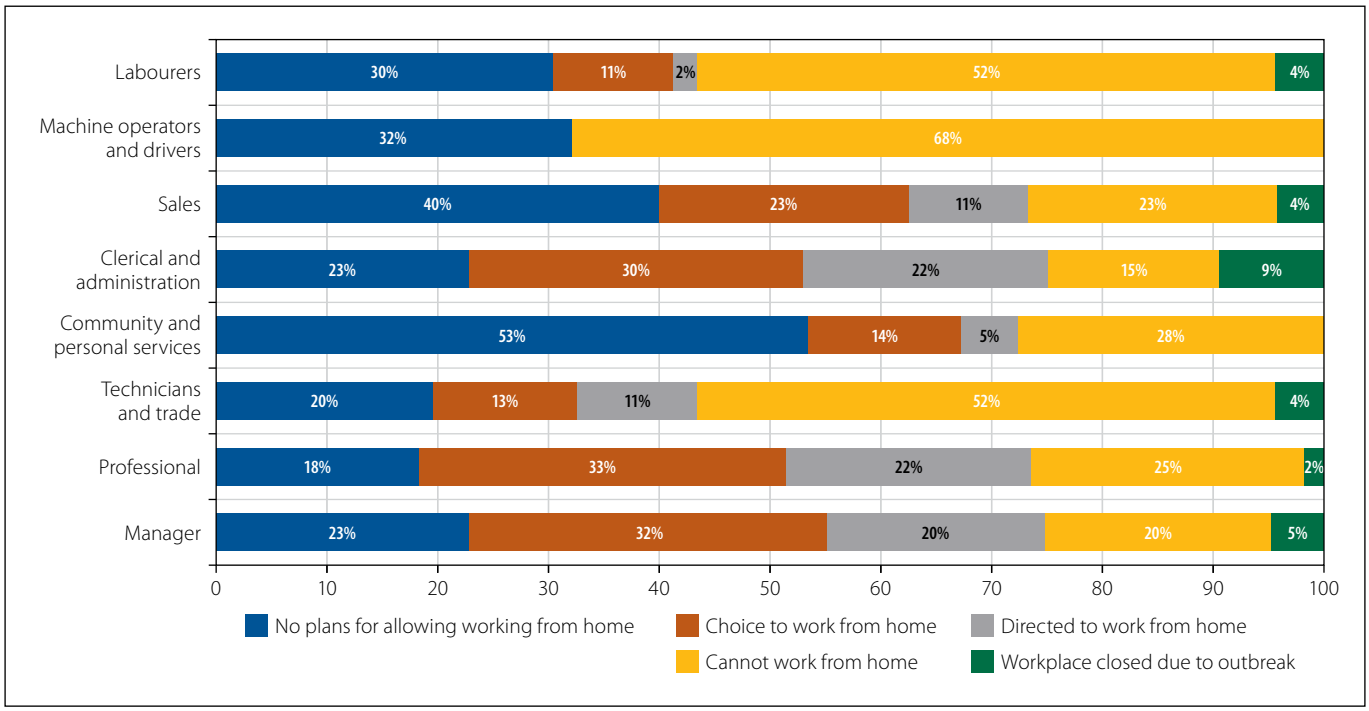

Figure 6 Distribution of WFH policy of employers according to occupation

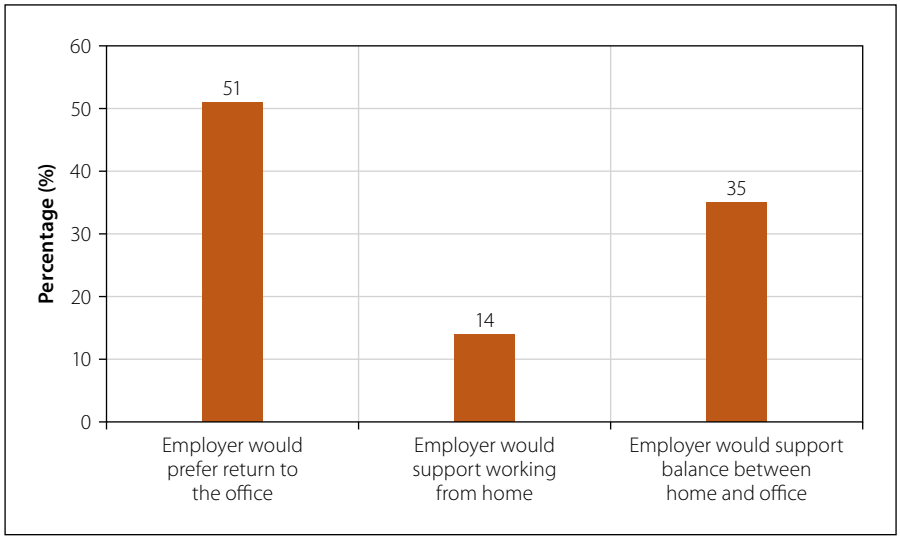

Figure 7 Position of employer regarding WFH after Covid-19 restrictions end

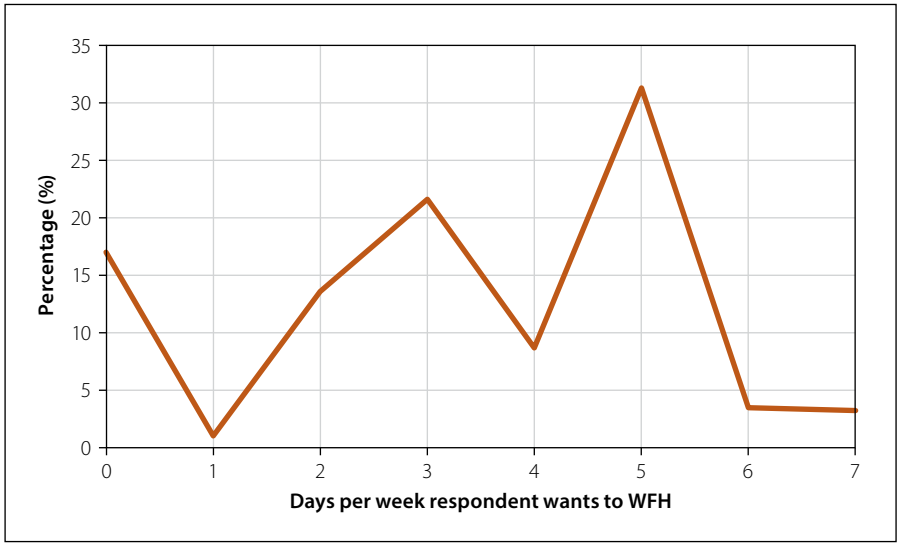

Figure 8 Number of days employed respondents would like to work from home as Covid-19 restrictions are eased (percentage of respondents)

in professional (55%), managerial (52%), clerical and administrative occupations (52%), while most labourers (52%), machine operators (68%), and technicians and trade employees (52%) cannot work from home. Employers who have no plans regarding WFH policies are mostly in community and personal services (53%) and sales (40%).

Another indication of whether WFH will persist after the end of the pandemic is the extent to which employers would continue supporting WFH. Figure 7 shows that most workers feel their employers would prefer employees to return to work, followed by employers who would prefer a balance between office and WFH, while some would support WFH as often as employees like. Almost 50% of employers therefore have a favourable position towards WFH in some form.

The number of days employed respondents would like to work from home in future when Covid-19 restrictions are eased is illustrated in Figure 8.

Most respondents (32%) would like to WFH five days a week, followed by three days per week (22%). However, there are respondents who don't like to WFH at all (17%). Other surveys have shown that resistance to WFH might be due to multiple reasons, including a preference for working in close proximity to team members and managers, and home conditions that are unsuitable. However, it is

notable that the vast majority would like to WFH at least some days of the week. Reasons for this desire might include higher productivity at home and savings in travel costs and time.

PREFERENCES FOR STAGGERED WORK HOURS

We were also interested to gauge whether the experience of having greater flexibility and control over working hours would cause workers to consider other shifts in their travel patterns that might ease traffic congestion. Asked whether respondents would consider staggered working hours if their employer allowed it, almost three out of five workers said they would prefer leaving home earlier to arrive at work earlier, while 16% would prefer to leave home later. Among the former group, the average worker would like to leave about an hour earlier than presently. This indicates that there is substantial scope for authorities to address congestion issues by supporting flexible work times, but that the shift should be towards an *earlier* workday rather than a delayed start.

PERCEPTIONS ABOUT PUBLIC TRANSPORT

To measure shifting perceptions around public transport, we asked people whether they were concerned with hygiene and sanitation on public transport. Figure 9 shows that levels of concern are very high. On average, 59% of people are extremely concerned, with concern levels highest for the minibus-taxi and train modes[3]. Gautrain scores best, but 35% of respondents are still extremely concerned about using this mode.

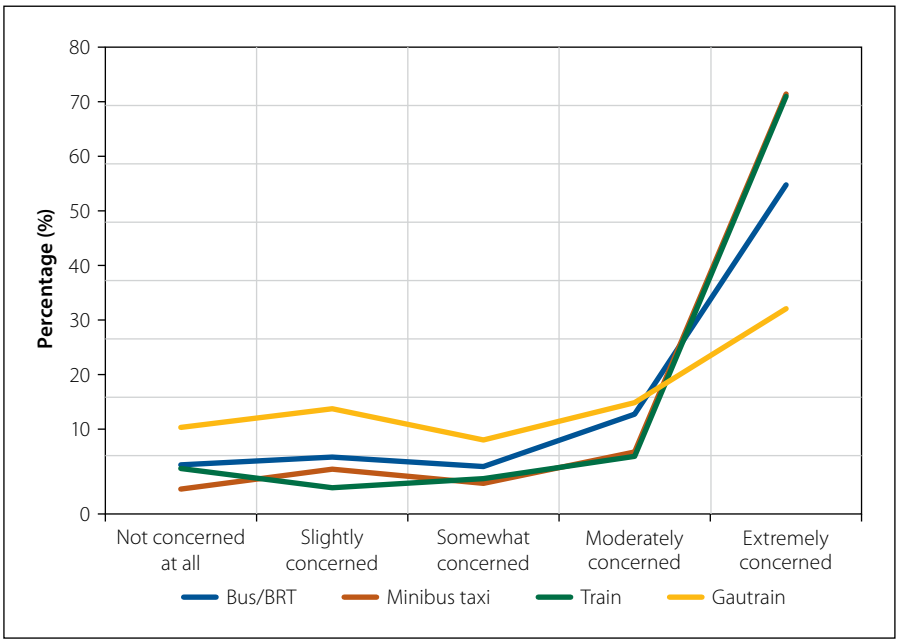

Figure 9 Level of concern about hygiene on public transport

As it is perceptions that will drive the return to public transport as much as actual policies and actions, these results bode ill for the immediate recovery of public transport ridership. Passengers clearly don't think public transport operators are doing enough to ensure safe travel. Asked whether health regulations like mask-wearing, hand sanitising, and open seats between passengers are enforced, a majority of people answered no (Figure 10). Once again, Gautrain does best (with 60% of people feeling Gautrain complies fully), and the minibus-taxi and Prasa train modes score worst (less than 20%).

CONCLUSIONS

These early results suggest that some shifts in travel behaviour might be short-lived, while others might endure for longer. Road traffic volumes are relatively resilient, and the overall amount of trip making within cities seems to recover quickly as businesses, schools, and social activities re-open. We are not likely to see substantial decreases in traffic congestion enduring much beyond the pandemic period – most car users see themselves increasing travel again in the

Road traffic volumes are relatively resilient, and the overall amount of trip making within cities seems to recover quickly as businesses, schools, and social activities re-open. We are not likely to see substantial decreases in traffic congestion enduring much beyond the pandemic period – most car users see themselves increasing travel again in the near future – although traffic growth rates might be slightly depressed by economic factors.

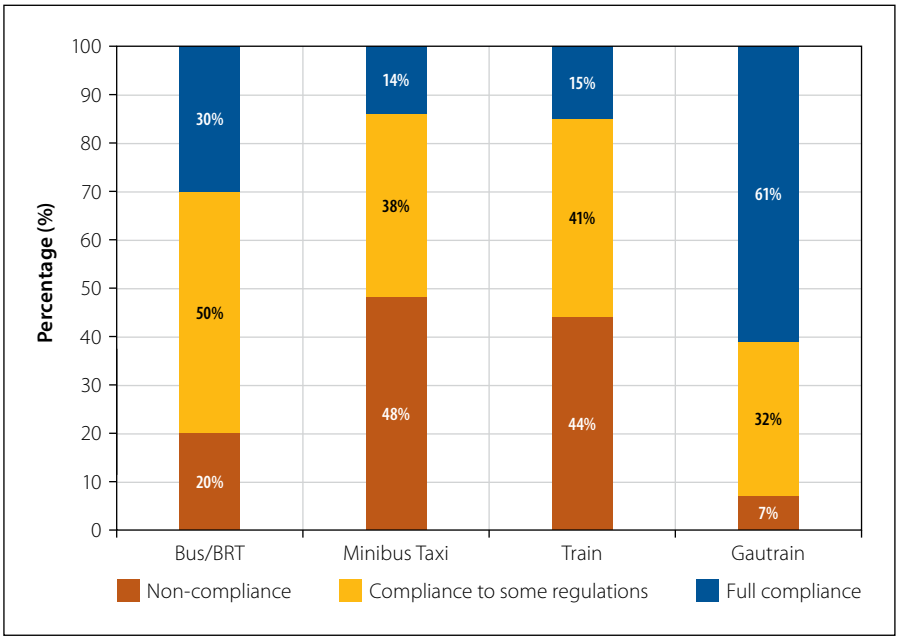

Figure 10 Compliance with health regulations on public transport

Of greater concern for sustainable transport is the impact of Covid-19 on public transport. The evidence from Gauteng suggests that public transport demand is likely to recover more slowly than private vehicle demand, driven to an extent by negative perceptions over levels of hygiene and compliance with regulations on-board taxis, trains and buses.

near future – although traffic growth rates might be slightly depressed by economic factors.

This is despite substantial ongoing interest in WFH. Our data indicate that in November 2020 about two out of five workers continued to work from home at least some days per week, and that most see themselves persisting with this practice. Many employers remain supportive of WFH, but the shift seems to be towards a hybrid approach where employees would commute to work some days and WFH the rest. Such changing work patterns might yet have unforeseen impacts on land use and real estate development, which might cause secondary changes in travel patterns. However, the overall impact on traffic volumes and congestion is likely to be limited, as the reduction in work travel seems to be off-set by a rise in non-work trips.

Of greater concern for sustainable transport is the impact of Covid-19 on public transport. The evidence from Gauteng suggests that public transport demand is likely to recover more slowly than private vehicle demand, driven to an extent by negative perceptions over levels of hygiene and compliance with regulations on-board taxis, trains and buses. Different modes are affected differently, with Gautrain seen as least concerning, and taxis and Prasa trains as worst. Walking and cycling made almost no gain in usage, in contrast to many other countries where these modes have really grown as an alternative to using crowded public transport. Whether these observations indicate long-term modal shifts remains to be seen, but conditions are likely to remain difficult for operators and authorities in the short- to medium-term. Operators and authorities must act if we are to protect the investments we have made in sustainable transport.

NOTES

1 See "Covid-19 and the future of public transport in South Africa" in the October 2020 edition of *Civil Engineering*.

2 Google Community Mobility Reports (**https://www.google.com/covid19/mobility/**) data are based on the location history captured by Google users when visiting different types of locations, as compared to a baseline calculated between 3 January and 6 February 2020. Apple's data (**https://covid19.apple.com/mobility**) reflect requests for directions in Apple Maps, compared the baseline of 13 January 2020.

3 Respondents with no opinion because they had no experience with a mode are excluded.