



ROSA Research
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The Commuting Patterns of Older Adults

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Summary of Findings and Recommendations

This research brief uses data from the Singapore Life Panel (SLP) and provides a general description of the commuting patterns of older adults in November 2021. By outlining the latter, we aim to provide some indication of whether Singapore's transport infrastructure adequately supports the commute needs of older adults and how older adults' commute fares against the Land Transport Authority (LTA) of Singapore's Land Transport Master Plan (LTMP).

Key findings

1. Self-owned car (32.8%) was the most preferred mode of transport, followed by the public bus (25.3%), MRT (24.4%) and walking (8.3%).
2. In terms of utilization, public bus (50.3%), MRT (39.7%), walking (23.2%) and self-owned car (21.0%) were the most common modes of transport in older adults' commute to work.
3. While the average work commute took 44 minutes, close to two fifths of older adults (38.8%) took longer than the LTA's targeted 45 minutes to commute to work. Older adults who took multiple modes of transport generally had a longer work commute.
4. A majority of older adults were generally satisfied with their commute to work, with 38.7% and 33.4% being moderately satisfied and very satisfied respectively.
5. Respondents were more satisfied with commutes that only utilize one transport mode, take a shorter commute time and are active commutes.

Policy recommendations

Based on these findings, we find that older adults' commuting patterns generally points towards a success in the LTA's efforts to achieve the goals set out by the LTMP. With regards to the length of work commute, however, more needs to be done to meet the LTMP's goal of 45 minutes or shorter commutes to work. Additionally, given that a significant proportion of older adults rely on public transport for their travel needs, including those with some degree of mobility impairment, improving the connectivity and efficiency of Singapore's transport system, while also keeping in mind the needs of those with mobility impairments will be important as Singapore embraces an aging society. In ensuring ease of access across the public transport network, this will facilitate older Singaporeans' independence and participation in daily life as they age gracefully.

Introduction

Commuting plays a large part of one's daily routine and has increasingly been shown to affect people's well-being and life satisfaction in various ways (Liu et al., 2022).

In Singapore, an average of 7,691,000 passengers made their commute by public transport each day in 2019 (Land Transport Authority, 2022). While this figure fell drastically to 5,040,000 in 2020 (Land Transport Authority, 2022) due to restrictions on movement and social activities owing to the global pandemic, recent statistics have shown daily ridership to be gradually picking up as more people resume social activities and return to the workplace (Tan, 2022). As such, a significant proportion of the population will likely be affected by any impacts of commuting on well-being.

Demographic and societal shifts point towards an increasing number of older commuters who travel on a regular basis as Singapore faces an ageing population, with 23.8% of the population expected to be aged 65 and above in 2030 (National Population and Talent Division et al., 2021). Additionally, with a growing trend towards delayed retirement (Gendell, 2008), as exemplified by the steady rise in employment rates among older adults from 25.5% in 2016 to 31.7% in 2021 for those aged 65 and above (Ministry of Manpower, 2022), an increasing proportion of older adults will continue to embark on a daily work commute in the years to come.

Furthermore, public transport infrastructure plays a crucial role in facilitating the mobility of older adults across the city. Research has identified individual mobility to be an important factor influencing older adults' level of participation in social activities (Atkins, 2001). Thus, it is relevant to consider the commute of older adults given its salience in allowing one to maintain independence in carrying out daily activities and social participation, particularly for older adults whose mobility may decline with the onset of age-related diseases (Horner et al., 2015; Hildebrand, 2003).

In this research brief, we aim to examine the travel patterns of older adults and provide some indication of whether the existing transport infrastructure in place adequately supports their commute needs. Specifically, we will look at older adults':

1. Preferred mode of transport
2. Transport modes utilized in their commute to work
3. Length of work commute
4. Commute satisfaction

To study the above, this research brief will use data from the Singapore Life Panel (SLP), a monthly panel survey that has been conducted since 2015 (see Vaithianathan et al. (2018) for details regarding sample recruitment). Respondents are part of a large sample of Singaporeans aged 57 to 76 and their spouses. This brief uses the data from November 2021. In total, 7399 respondents completed the November survey, corresponding to a response rate of 83.9%.

Land Transport Master Plan 2040

To contextualize Singapore's existing plans to develop the transport infrastructure, the Land Transport Authority of Singapore (LTA) released a report titled the Land Transport Master Plan (LTMP) 2040 in 2019, announcing the LTA's long-term plans of building a convenient, well-connected, inclusive, and fast land transport system to meet the needs of Singaporeans by 2040 (Land Transport Authority, 2019).

The LTMP outlines their goals and recommendations, which are broken into the following three main themes:

1. A 45-minute City with 20-Minute Towns
2. Transport for All and Healthy Lives
3. Safer Journeys

Noting the rise in use of active mobility, such as walking, cycling and use of Personal Mobility Devices (PMDs), and public transport in commuting, the LTA saw the need to improve infrastructure to facilitate what they have termed 'walk-cycle-ride'. As such, the first theme is focused on creating a fast, convenient, and well-connected transportation network by investing in public transportation infrastructure to reduce commute times. Journeys to an individual's nearest neighbourhood centre are targeted to be reached within 20 minutes, and commutes to an individual's workplace during peak period within 45 minutes. Developments outlined to achieve this goal include expanding the cycling path network to more than 1000km by 2040 and implementing enhanced priority lanes for buses to improve bus speeds.

The second theme focuses on creating an inclusive commuting journey, both in terms of infrastructure and commuting culture. This includes creating barrier-free access routes for walk-cycle-ride modes of transport to facilitate ease of accessibility for commuters with other mobility needs, such as seniors and persons with disabilities.

The final theme looks towards increasing the amount of space available for walk-cycle-ride modes of transport to improve accessibility, reduce the carbon footprint of public transportation and improve road safety for commuters. Some planned initiatives to meet these objectives include constructing covered walkways, converting bus fleets to electric vehicles, and redesigning roads to slow traffic speeds.

While the LTMP was not designed specifically with older adults in mind, many of the outlined initiatives will be equally beneficial to them. By making transportation more convenient, safe, and accessible, it reduces barriers to community participation. This is especially so for individuals who may experience mobility decline in old age.

Older Adult's Transport Preferences

We first looked at older adults' commuting preferences to understand their attitudes towards various modes of transport. Respondents were asked to consider the time, comfort, and cost of 11 common modes of transport and rank them according to their preference from their most preferred to the least. To identify the most preferred mode of transport among older

adults, we looked at the transport mode that respondents ranked first. Close to a third of respondents (32.8%) chose commuting via self-owned car as their most preferred mode of transport, followed by the public bus (25.3%), MRT (24.4%) and walking (8.3%) (as shown in Figure 1). Cycling was ranked as the most preferred mode of transport by a very small proportion (1.7%) of older adults. Notably, travelling via one's personal car was the most preferred mode of transport for older adults even after factoring in cost as a consideration in their evaluation. Possibly, for these respondents, the value of convenience and comfort goes above and beyond cost considerations. Generally, the order of older adults' transport preference remained fairly similar across most demographic groupings. We only note a few observable differences in older adults' commuting preferences along gender, age, and socioeconomic backgrounds.

A greater proportion of men expressed a strong preference to commute via self-owned car (36.7%) than women (29.2%) (see Figure A1 of Annex A). Additionally, with age, older adults increasingly ranked the public bus as their most preferred and a decreasing proportion of them ranked self-owned car as their most preferred (see Figure A2 of Annex A). Commute preference was also closely related to socioeconomic status (SES). Using highest education level and housing type as an indicator of their SES, we observe that older adults with higher SES are more likely to rate self-owned cars and less likely to rate public buses as their most preferred mode of transport (see Figure A3 and A4 of Annex A).

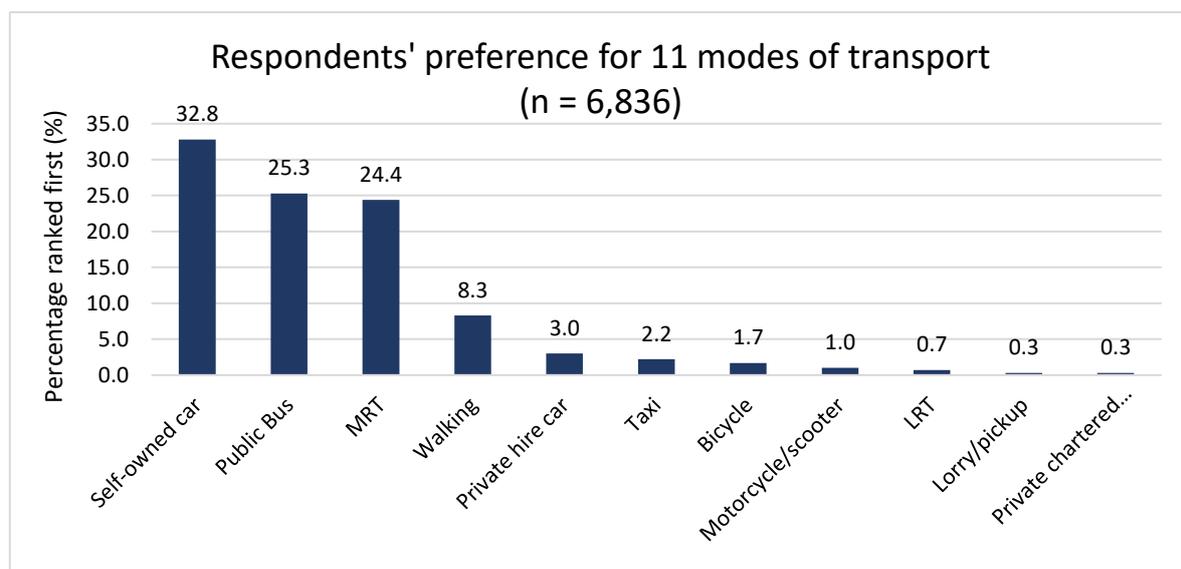


Figure 1: Respondents' Preference for 11 Modes of Transport

Commute to Work Patterns

Transport Modes

To examine older adults' commuting patterns, we looked specifically at the travel patterns of respondents commuting to work as it is a routine daily activity that most working adults engage in. However, this set of questions was fielded in November 2021, during which Singapore was in its COVID-19 "Stabilization Phase" and working from home was the default

for those able to work from home (Ministry of Health, 2021). As such, only 36.4% of respondents regularly travelled to the workplace.

Similar to their preferences, the most common commute modes utilized by older adults were the public bus (50.3%), MRT (39.7%), walking (23.2%) and self-owned car (21.0%) (as shown in Figure 2). However, while the top four modes of transport were similar across preference and utilization, the order in which they were ranked differed. Specifically, despite personal cars being ranked the most-preferred mode of transport, it was only ranked fourth in terms of utilization.

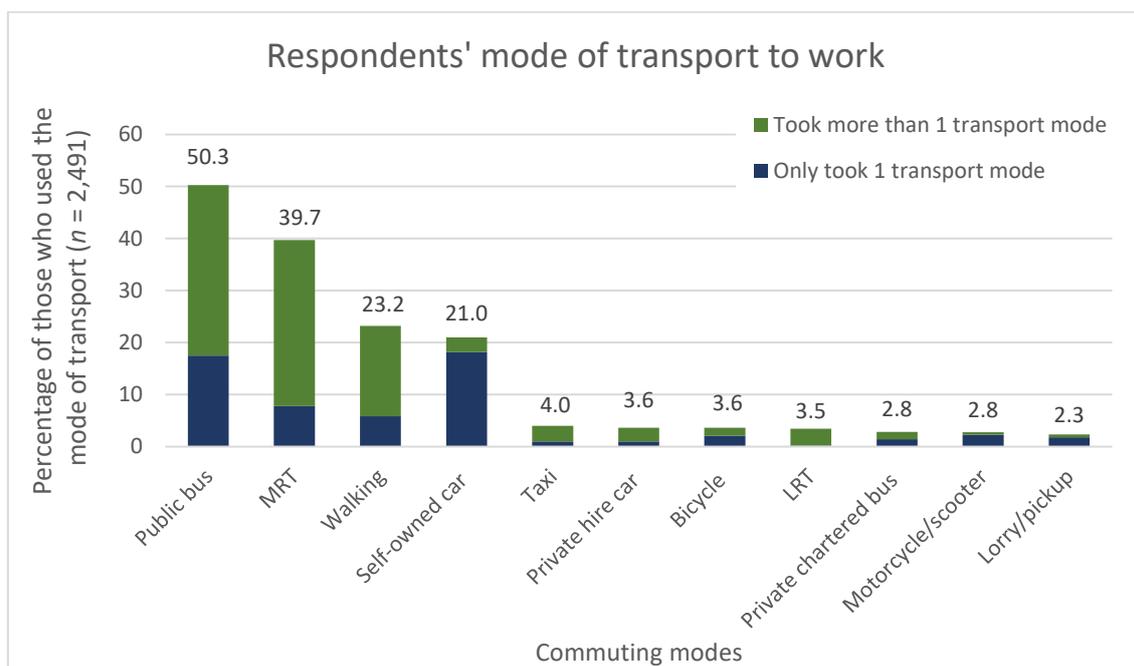


Figure 2: Respondents' Mode of Transport to Work

Primarily, most older adults (60.1%) used a single mode of transport in their commute to work. Of these individuals, personal cars were the most common mode of transport. On the other hand, 39.9% of older adults relied on multiple modes of transport for their journey to the workplace. Older adults commonly utilized more than one mode of transport when they relied on public transportation (public bus, MRT & LRT) or walked to work (see Figure 2). Additionally, despite existing efforts to promote cycling as a form of last mile transport, only 3.6% of respondents utilized the bicycle in their work commute. With a significant minority relying on multiple transport modes, maintaining connectivity across the different transport systems remains an important objective.

Commuters were classified into three groups based on their predominant mode of transport. "Shared" commuters were respondents who spent a majority of their commute on transport modes that are shared with other individuals (i.e., public bus, MRT, LRT, private chartered bus/van, or lorry/pickup). "Private" commuters were respondents who primarily made their work commute using private modes of transport (i.e., self-owned car, taxi, private hire car, or motorcycle/ scooter). "Active" commuters were those who predominately walked or cycled

to work. A majority of respondents were shared commuters (67.1%), close to one in four (24.3%) were private commuters, and only 8.6% were active commuters.

Among respondents who travelled regularly to the workplace in November 2021, we found that 10.6% of these respondents experienced some difficulty walking 400m. Thus, to identify if less mobile older adults continue to rely on the public transport infrastructure, we examined the commute patterns of older adults with and without any walking difficulty. Compared to those without mobility issues, our data suggests that a larger proportion of those with reduced mobility rely on public transportation or walk in their commute to work. Specifically, we found that the proportion of mobility impaired respondents who use the public bus (66.9%) is significantly greater than respondents with no mobility issues (48.7%) (see Figure 3). While socioeconomic standing may be a confounding factor as to why a greater proportion of those with mobility issues are likely to rely on public transportation, given the well-established associations between physical health and socioeconomic status (Dalstra et al., 2004; Smith, 1999; Mackenbach et al., 2008), such trends also indicate that many older adults may continue to rely on public transportation even after the onset of mobility limitations. Such findings further reinforce the vital role public transportation plays in facilitating the independence and participation of older adults, especially for those with mobility challenges.

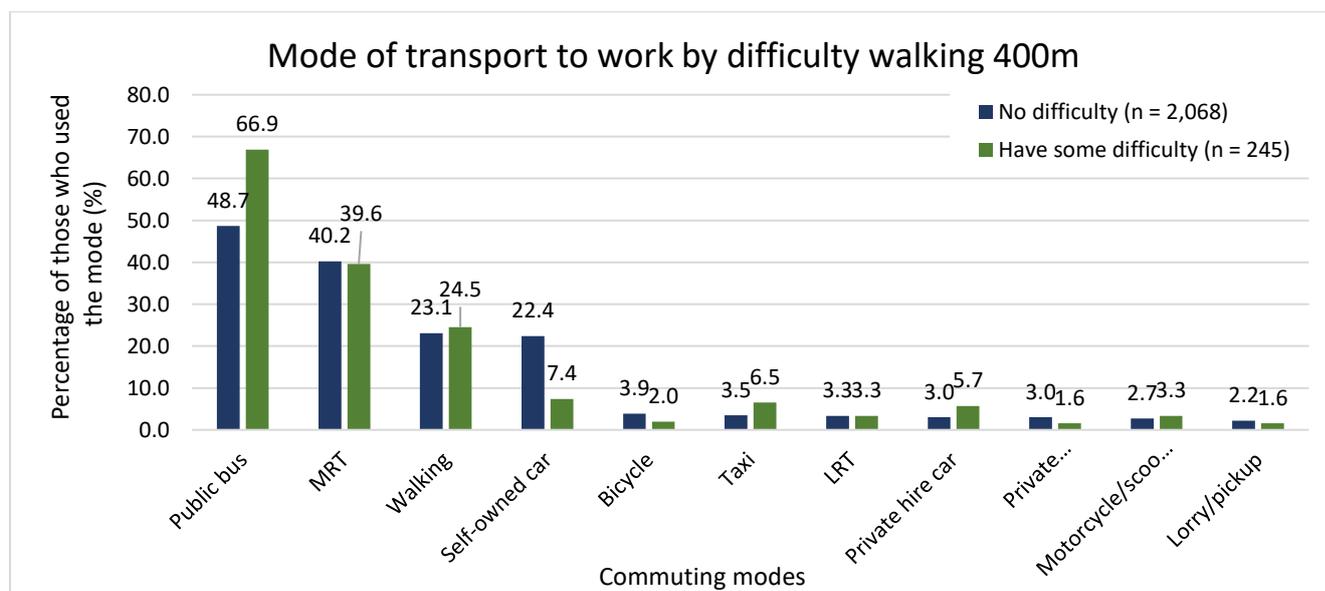


Figure 3: Respondents' Mode of Transport to Work by Difficulty Walking 400m

Transport Time

Overall, respondents took an average time of 44 minutes to travel to work, meeting the LTA's LTMP benchmark of under 45-minute work commutes. However, close to two fifths of older adults (38.8%) took longer than the targeted 45 minutes to commute to work.

To identify the characteristics of older adults who had work commutes of more than 45 minutes, we compared it with the number of transport modes utilized. We found that those

whose commute involved more than one mode of transport had a significantly longer commute time than those who only took one mode of transport (see Figure 4). On average, respondents who relied on multiple modes of transport took 55 minutes to commute to their workplace, while those who relied on a single mode of transport only took 37 minutes.

Several reasons could account for why commutes involving various modes of transport take a longer time. For instance, trips involving multiple modes of transport could require longer waiting times when transferring between different transport modes. Possibly, longer commute times could also be due to such trips being farther in distance. Moreover, trips involving a single mode of transport are likely shorter due to a significant proportion of such trips being made via self-owned cars (30.7%), which would likely take less time as it would typically involve a direct route home to the workplace.

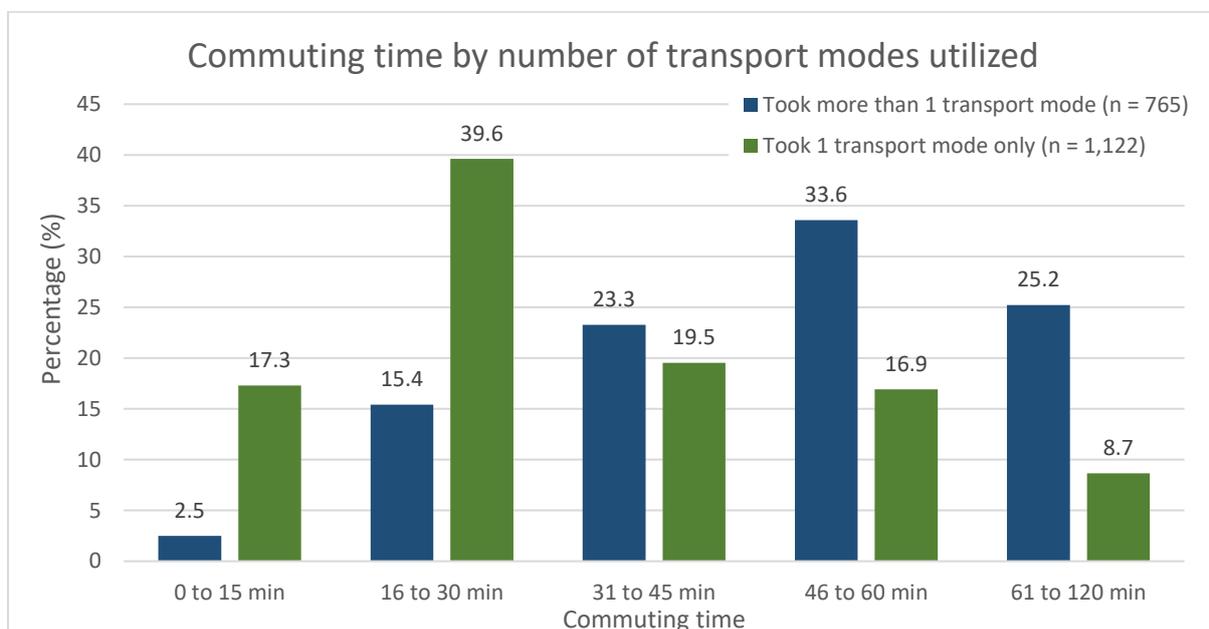


Figure 4: Commuting Time by Respondents Who Took 1 or More Modes of Transport to Work

Commute Satisfaction

Overall, older adults were generally satisfied with their commute to work, with 38.7% and 33.4% being moderately satisfied and very satisfied respectively (see Figure 5). To explore the factors that affect one's commute satisfaction, we examined the relationship between commuting satisfaction and the various commuting characteristics.

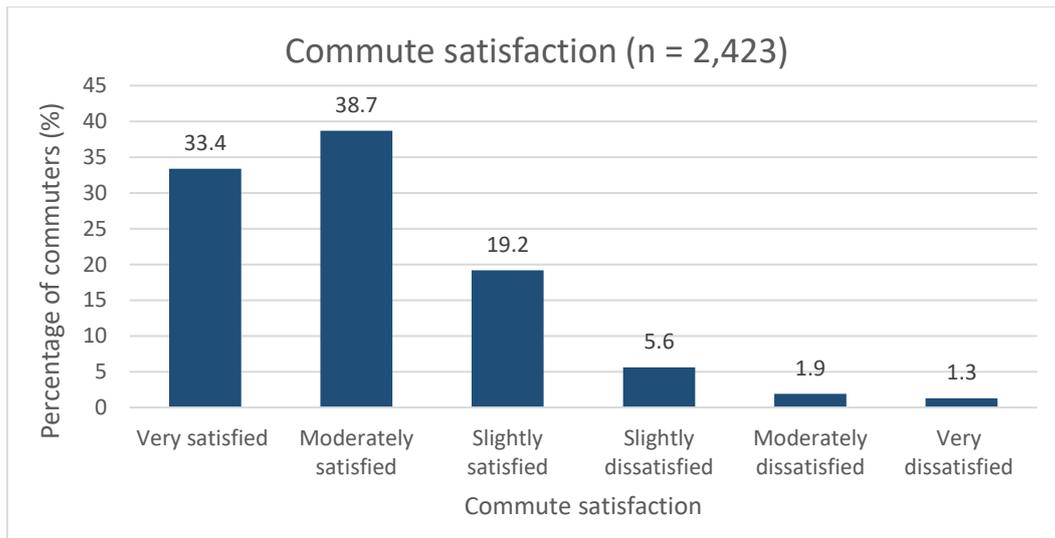


Figure 5: Distribution of Commute Satisfaction

First, there was no clear pattern in the relationship between one's commuting modes and commute satisfaction. This could largely be due to a significant proportion of respondents using various modes of transport in their daily work commute. Second, in terms of the number of transport modes utilized, we found that those who took one mode of transport were more likely to be satisfied than commuters who took more than one mode of transport (see Figure 6). Third, when comparing commute satisfaction across the different types of commuters, active commuters were most likely to be very satisfied with their commute (53.4%), followed by private commuters (44.5%) and shared transport commuters (23.5%) (see Figure 7).

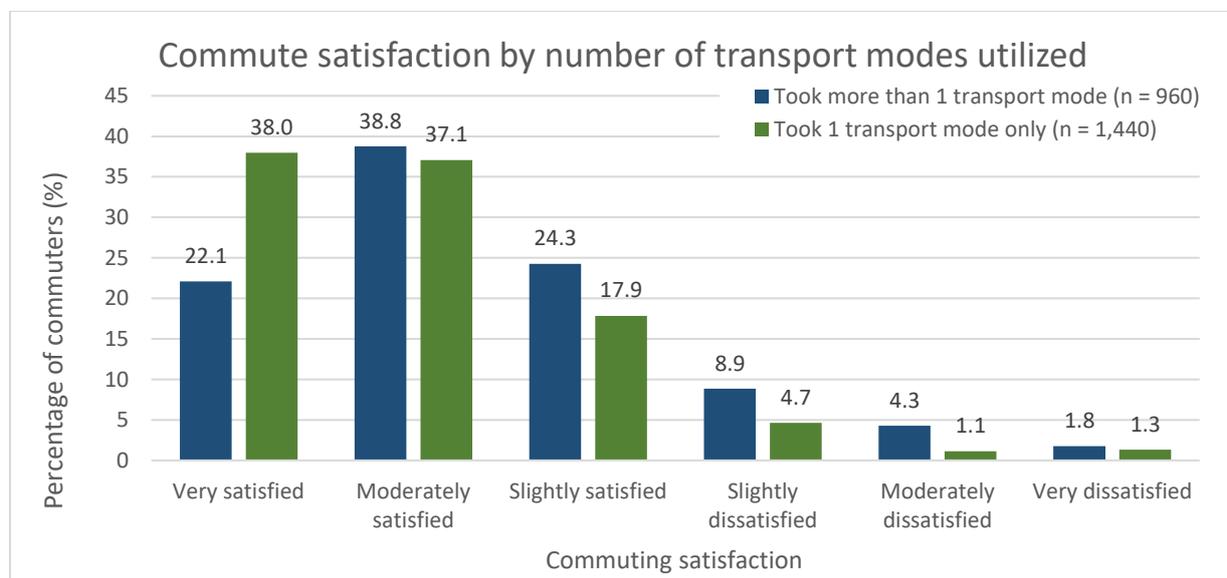


Figure 6: Distribution of Commute Satisfaction by Number of Transport Modes Utilized

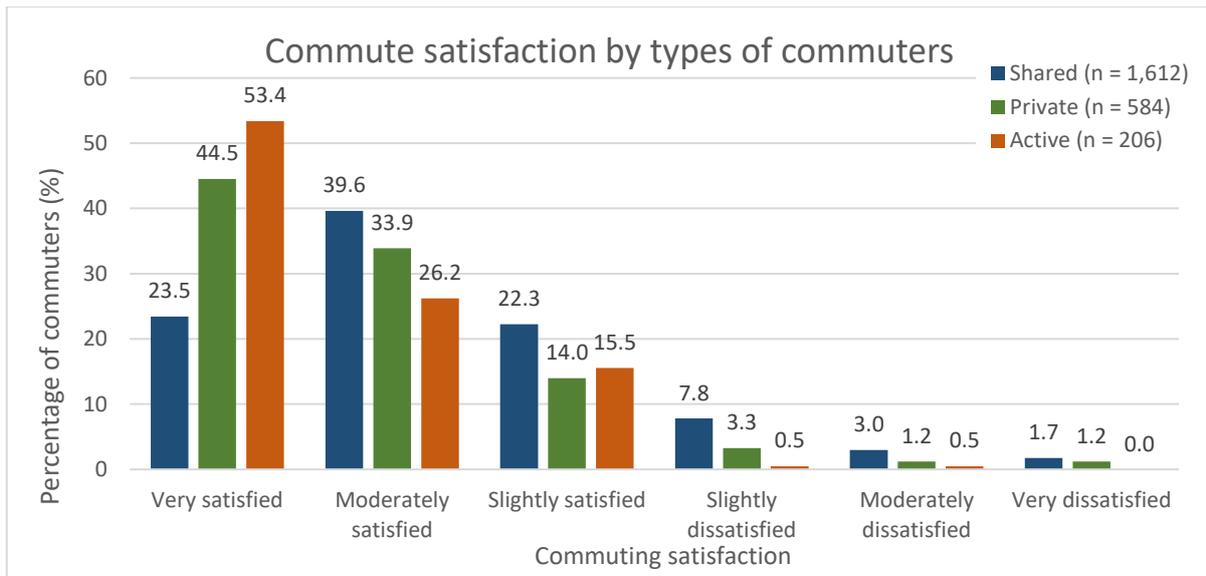


Figure 7: Distribution of Commute Satisfaction by Types of Commuters

Finally, with regards to commute time and commute satisfaction, we observed a significant negative relationship between the two. Older adults expressed less satisfaction with their commute as the length of commute increased (see Figure 8). These findings reaffirm other studies which have found a similar relationship between the two factors. For instance, Stutzer and Frey (2004) have found that 69% of those whose commute took longer than 30 minutes found it to be burdensome. They suggest that commuting itself is a stressful experience due to the monetary costs involved and environmental stressors encountered along the way, such as noise, crowds, pollution, and thermal conditions (Stutzer & Frey, 2008). These stressors result in negative physical and emotional reactions in the individual, which can be worsened by the longer time and distance involved in the commute (Stutzer & Frey, 2008). Additionally, Kahneman et al. (2004) also found commuting to be the daily activity that people enjoyed the least and disliked the most, which could explain why longer commutes were associated with lower commute satisfaction in our analysis.

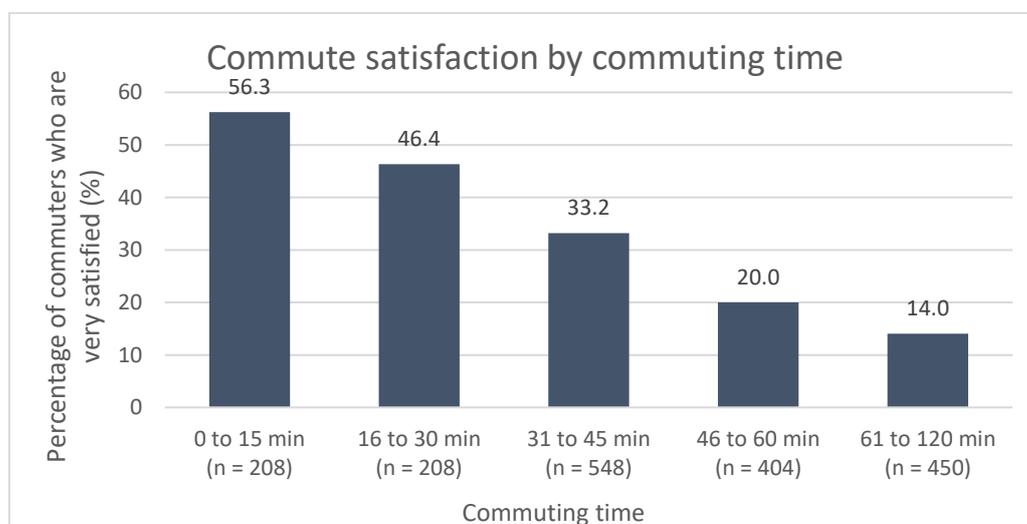


Figure 8: Commute Satisfaction by Commuting Time

Conclusion

There are three key takeaways from this research brief. Firstly, based on the findings, we can conclude that a significant proportion of older adults rely on public transport for their travel needs, including those with mobility impairment. This aligns with findings from the Singapore Census of Population 2020, which reported that up to 57.7% of employed residents commute with a combination of public bus, MRT and LRT (Singapore Department of Statistics, 2021). Such findings suggest that the current public transport system is well-designed and accessible for most older adults and underscores the importance of maintaining the built infrastructure to meet their needs. Doing so would ensure that older adults are able to maintain independence and participation in daily life as they age. Additionally, despite efforts to promote the use of public transport, there remains a strong preference for and use of private-owned cars among older adults, particularly those from higher socioeconomic backgrounds. Possible reasons for such a preference could include comfort, convenience and privacy when travelling via personal cars. Further research will be needed to pinpoint the reasons for this preference in order to design targeted interventions to nudge more older adults towards the use of public transport.

Further, despite the reported cycling boom in 2020 after the COVID-19 circuit breaker (Abdullah, 2020), cycling is only preferred and used as a mode of transport by a small group of respondents. While the reasons were not explored in this brief, safety issues and inconvenience are commonly cited as the two main barriers to cycling (Lee and Pojani, 2019). This concern is supported by the 2021 annual traffic statistics which reported a yearly average of 597 road accidents involving bicycles over the last five years, with an average of 11 accidents being fatal. This highlights the importance of having proper and complete physical infrastructure with well-connected cycling paths for cyclists to ride safely. We are mindful that improving the cycle network may not sufficiently encourage cycling as a primary form of transportation as it is commonly perceived as a leisure activity. Thus, changing perceptions towards the utility of cycling could also be an important barrier to overcome in the effort to promote it as a regular mode of transport.

We found walking to be among the four most-preferred and most-used modes of transport by older adults. The generally high preference and choice to incorporate walking as part of one's commute to work could indicate the success of the LTMP's recent efforts to improve the safety and walkability of footpaths across Singapore. Such efforts include the creation of 50 silver zones, reducing traffic speeds in areas where footfall and car traffic is high, such as places near town amenities and schools, and introducing extended crossing times for seniors and persons with disabilities at selected pedestrian crossings (Land Transport Authority, 2019).

Secondly, with regards to the length of older adults' work commute, more needs to be done to meet the LTMP's goal of 45 minutes or shorter commutes to work. While we found that older adult's average commute took less than 45 minutes, two in five respondents took more than 45 minutes to commute to work. Longer commutes were also more common among those who utilized multiple modes of transport. These findings point towards the need for improvements in the connectivity and efficiency of Singapore's transport system. With

regards to older adults specifically, the built infrastructure must be designed with the needs of those with mobility impairments in mind to ensure ease of access across the public transport network.

Finally, given the preliminary findings between the various commuting characteristics and commute satisfaction, we found that commuters were generally more satisfied if their commute involved a single mode of transport, was an active commute, or took a shorter amount of time. These findings provide empirical support for the importance of a well-connected, comfortable and accessible transport system, as identified by the LTMP. Existing efforts to reduce transfers between different modes, crowds, and commute time, could make an important difference in improving the commuting experience of all.

All in all, our findings demonstrate the vital role transport plays in the daily lives of older Singaporeans. Follow up research to uncover the rationale behind older Singaporeans' commute preference and utilization would be important in developing targeting interventions to encourage the uptake of "walk-cycle-ride" modes of transport among older adults. Additionally, more information on aspects of one's commute such as waiting times, distance travelled, and leisure commute patterns for leisure purposes could be important areas to examine in future research to understand the mechanisms through which commute impacts well-being.

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Annex A

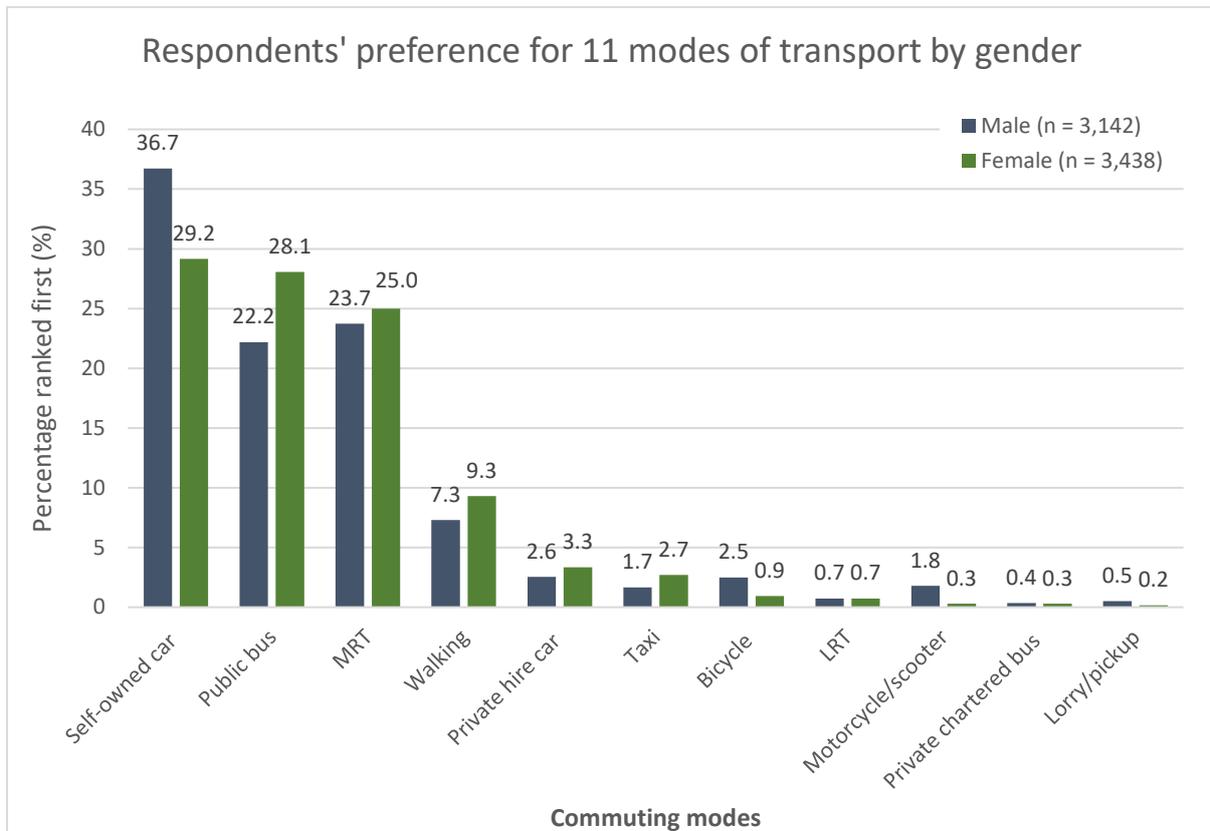


Figure A1: Respondents' Preference for 11 Modes of Transport by Gender

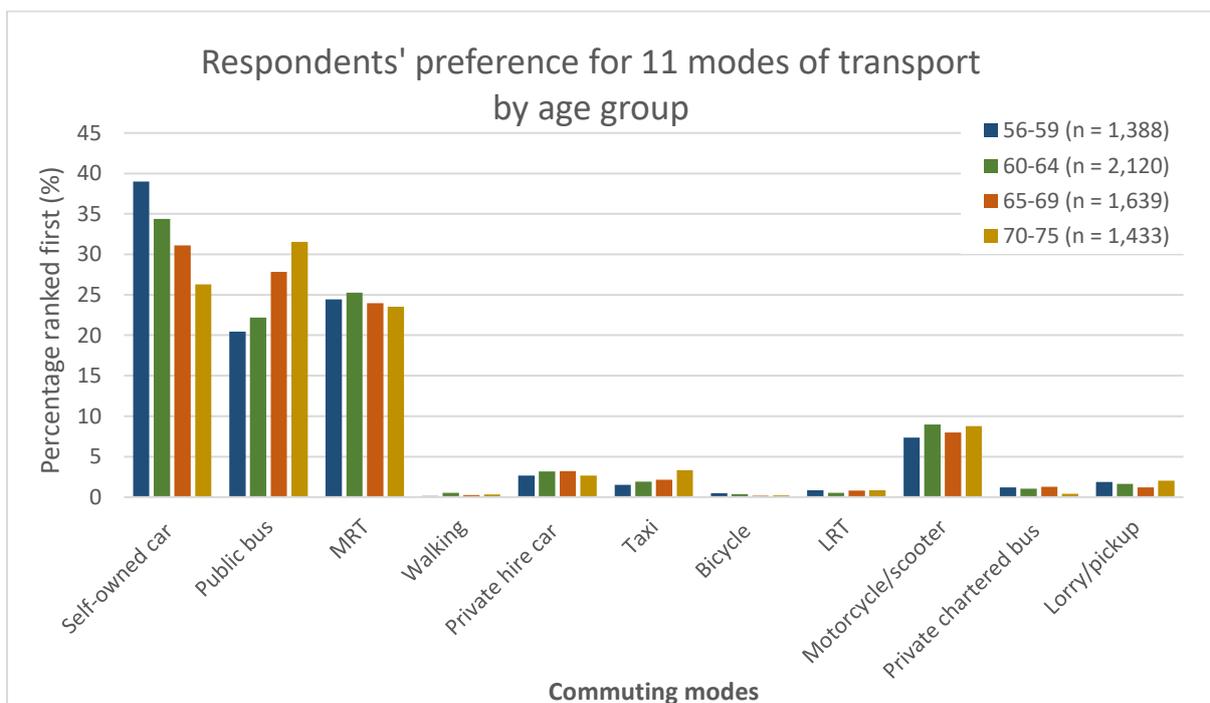


Figure A2: Respondents' Preference for 11 Modes of Transport by Age Groups

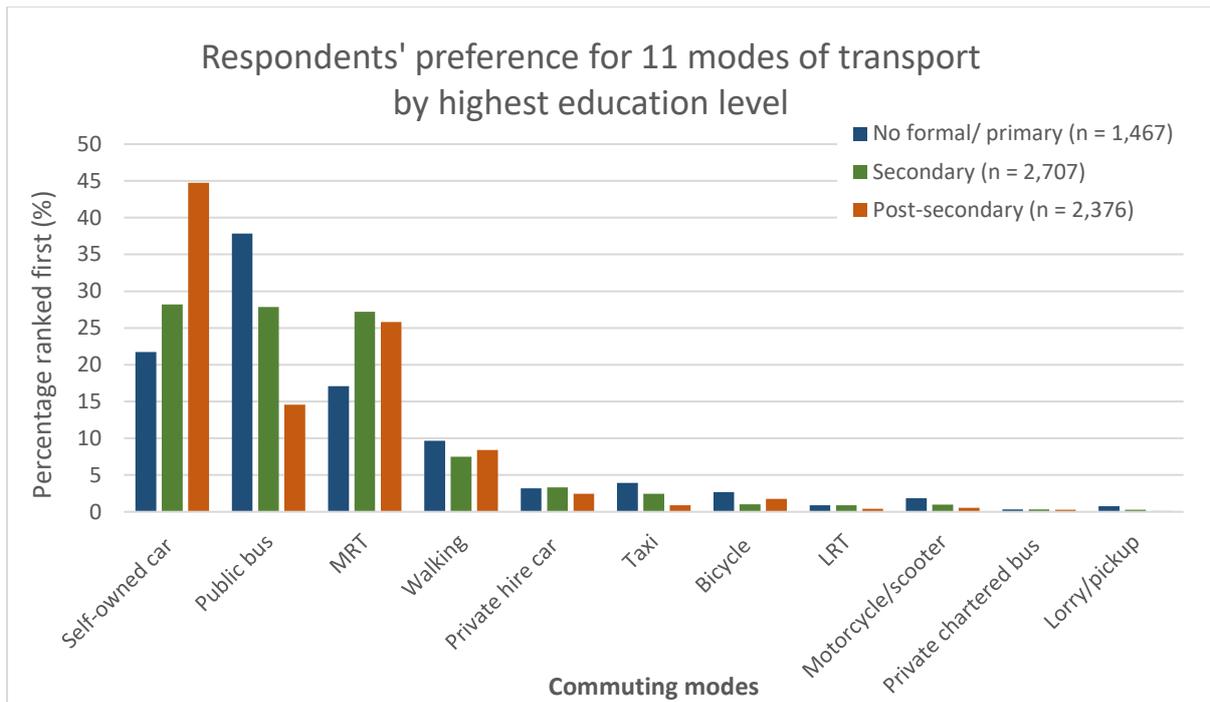


Figure A3: Respondents' Preference for 11 Modes of Transport by Highest Education Level

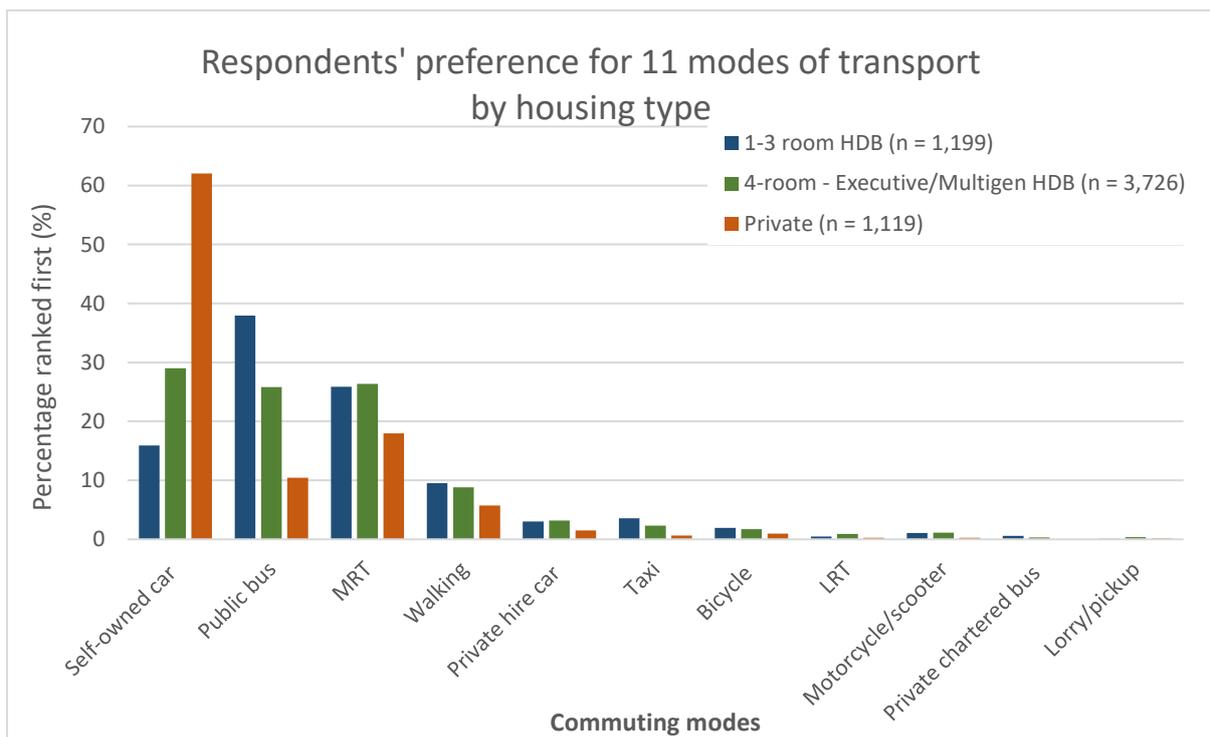


Figure A4: Respondents' Preference for 11 Modes of Transport by Housing Type

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About the Centre for Research on Successful Ageing (ROSA)

ROSA is a multidisciplinary research centre based in SMU. It was established with an MOE Tier 3 social sciences research grant, as well as the generous support of The Ngee Ann Kongsi. Research at ROSA seeks to define and measure a holistic construct of well-being and to identify the factors that impact Singaporeans' well-being as they progress through the later phases of life. Through close collaboration with government and other partner agencies, ROSA also aims to translate research insights into policy innovations that advance the well-being of older adults holistically and promote successful ageing in Singapore. ROSA brings together a diverse team of leading international and local researchers in ageing and age-related issues from various disciplines. Through empirical evidence derived from a longitudinal methodological approach, the multidisciplinary and multi-institutional research team advances propositions that promote successful ageing in Singapore.

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