Department of Economics, University of Warwick

Monash Business School, Monash University

as part of

Monash Warwick Alliance

Is car sharing in Australia socio-spatially equitable?

Angeline Bilas

Warwick-Monash Economics Student Papers

March 2023   **No: 2023/52**

The Warwick Monash Economics Student Papers (WM-ESP) gather the best Undergraduate and Masters dissertations by Economics students from the University of Warwick and Monash University. This bi-annual paper series showcases research undertaken by our students on a varied range of topics. Papers range in length from 5,000 to 8,000 words depending on whether the student is an undergraduate or postgraduate, and the university they attend. The papers included in the series are carefully selected based on their quality and originality. WM-ESP aims to disseminate research in Economics as well as acknowledge the students for their exemplary work, contributing to the research environment in both departments.

"*We are very happy to introduce the Warwick Monash Economics Student Papers (WM-ESP). The Department of Economics of the University of Warwick and the Economics Department at Monash University are very proud of their long history of collaboration with international partner universities, and the Monash Warwick Alliance reflects the belief in both Universities that the future will rely on strong links between peer Universities, reflected in faculty, student, and research linkages. This paper series reflects the first step in allowing our Undergraduate, Honours, and Masters students to learn from and interact with peers within the Alliance.*"

Ben Lockwood (Head of the Department of Economics, University of Warwick) and Michael Ward (Head of the Department of Economics, Monash University)

Recommended citation: Bilas, A. (2023). Is Car Sharing in Australia Socio-Spatially Equitable? *Warwick Monash Economics Student Papers* 2023/52.

---

[1] Warwick Economics would like to thank Lory Barile, Gianna Boero, and Caroline Elliott for their contributions towards the selection process.

Is car sharing in Australia socio-spatially equitable?

Angeline Bilas*

Abstract

This paper investigates the impact of car sharing services (GoGet and Flexicar) on transport equity in Melbourne and Brisbane, Australia, including two lower socio-economic regions of Melbourne. The results show evidence of strong latent demand for car sharing services in these areas, indicating the potential for car sharing to improve access to transport and transport equity for disadvantaged communities. The study also finds that the main barriers to the adoption of car sharing were lack of availability, cost and lack of awareness. The findings suggest that expanding car sharing services could improve transport equity outcomes in low socio-economic areas.

Keywords car sharing, transport equity, low socio-economic regions

*Email angebilas@yahoo.com

Introduction

Socio-spatial justice is the idea of equitable distribution of key resources over a geographical area. A social justice approach to assessing transport infrastructure focusses on different social groups, the distribution of transport infrastructure amongst these groups and the performance of transport infrastructure for these groups (Martens 2006).

Over the last twenty years a socio-spatial equity approach to assessing the provision of transport infrastructure has grown in response to shortfalls in the demand based and cost-benefit based approaches. Under these approaches, demand for transport infrastructure reflected those socio-economic groups with income. Hence the built transport infrastructure served mostly the socially advantaged.

This has resulted in an inequitable access of transport infrastructure by socio-disadvantaged groups. Access to transport infrastructure is important to ensuring social connectedness, access to education, hospitals and work (Martens 2006 and Lucas 2012). In particular, the lack of access to transport infrastructure can and has worsened the outcomes for socio-disadvantage groups.

In cities/regions where the public transport system is not socio-spatially just alternative transport modes, for example car sharing, has the potential to supplement the public transport system and assist in achieving equity outcomes (Adli and Chowdery 2021).

This research paper considers if car sharing in Melbourne and Brisbane socio-spatially equitable? And If proximity to car sharing is not a barrier to usage, then what are the non-spatial barriers to car sharing in these cities?

Literature review

Car sharing services allows one to rent a car for a short period (usually hours). This involves picking up the car from a specified spot and returning it to the same spot. There are variations to the service - some car sharing services allow the car to be picked up from one spot but returned to a different spot in a specified locality (free-floating). In Australia the for-profit car sharing services are GoGet, Flexicar, Popcar, Turo, Car Next Door. There are also peer-to-peer car sharing services, which involves private car owners renting their car for usually a short period.

There is not a lot of research on car sharing and socio-spatial equity. This may be because data on usage of car sharing services is difficult to obtain as it is the property of the car sharing service provider and rarely provided for research.

Dill and McNeil 2021 undertook a literature review on car sharing (amongst other modes of travel) and summarised the following findings from a survey of literature on the proximity of car sharing services (a measure of accessibility) among different population groups:

Population group	Proximity to car sharing service
Race/ethnicity	Mixed findings; few studies
Income	Mixed findings; few studies
Gender	Unclear; too few studies
Older adults	Some disparities; few studies
People with disabilities	No evidence

A study by Pede and Staricco (2021) analysed if car sharing is socio-spatially just in the cities of Rome, Milan and Turin. The study mapped out the locations of station based and free floating cars and calculated a deprivation index to assess if car sharing services serviced car-less homes. The study found that these services were found less in deprived areas and tended to service urban areas or areas where homes were likely to own a car.

Kim (2015) analysed car sharing services across New York City boroughs using a socio-spatial approach and found that the demand for car sharing services in low income areas was not different from the demand for car sharing services in medium to high income areas where the service was available. The price of the service or affordability was a barrier in low income neighbourhoods to using more of the service. However, car sharing services were not equitably located and were mostly found in socially advantaged areas.

Clark and Curl (2016) undertook a socio-spatial analysis of car sharing in Glasgow and found that accessing car sharing in areas with car-less households did not differ much with accessing car sharing in households with cars. Their findings are inconsistent with the findings from the Kim (2015) and Pede et al (2021) studies.

Is the public transport system in Australia socio-spatially just?

A study by Currie and Delbosc (2011) found public transport was inequitably distributed among the population in the city of Melbourne. A similar analysis was undertaken by Ricciardi et al (2015) on the distribution of public transport in city of Perth for disadvantaged groups such as the low income, elderly and no-car households. The study found that compared to the general population, public transport was less equitably distributed. Interestingly both studies found that car-less households were relatively well served by public transport.

Scheurer et al (2017) found that transport accessibility and social advantage were correlated in all major Australian cities.   The socially advantaged areas were serviced with better accessibility to public transport systems. The disadvantaged were more likely to live in areas with lower accessibility to public transport services.

Car ownership was thought to be a way to achieve equity in a public transport system characterised by spatial inequity. However, the reliance on car ownership to improve spatial equity led to a more inequitable outcome as cars are expensive and out of reach for the young, elderly or disabled. Low-income areas faced higher transport inequity, hence requiring car ownership at a relatively higher cost to the household budget (Scheurer et al 2017).

Why car sharing is important to improving social outcomes

Taylor and Ong (1995) tested the 'spatial mismatch' hypothesis and found that the distance from public transport was not as important as the access to other modes of transport, notably cars to improve economic outcomes, such as employment.

A study by Boarnet et al (2017) highlighted the importance of alternative modes of transport to the public transport system, for example car sharing, to improve access to employment for low income neighbourhoods. Their findings are similar to other studies that found access to cars improved economic outcomes.

Fan (2012) also found that access to cars, in this case car ownership, was effective in improving employment opportunities among the disadvantaged. This finding was also supported by Grengs J (2010), who found access to cars improved employment outcomes in a study on the city of Detroit, US.

This research paper contributes to the literature by investigating car sharing in the cities of Melbourne and Brisbane, and in two of the lower socio-economic regions of Melbourne, to assess if it improves transport equity. The focus of the study is the two most popular for-profit car sharing services – GoGet and Flexicar. The geographical areas of the study are relatively high density but differ in socio-economic conditions. High density is an important factor in supporting for-profit car-sharing services (Shaheen et al 1998).

The next section outlines the methodology applied in this research paper to assess if car sharing is socio-spatially equitable in the cities of Melbourne and Brisbane, and to identify the non-spatial barriers to car sharing.

Data and empirical approach

Case study – Melbourne and Brisbane

The research question this paper considers is, is car sharing in Melbourne and Brisbane socio-spatially equitable? The premise is if the car sharing service is in close proximity then there is the potential for it to be used, especially in areas where the public transport system is not serving the needs of the local population.

Car sharing locations in Melbourne and Brisbane are found on the websites of car sharing companies GoGet and Flexicar. To identity the socio-economic status of the areas the car sharing services are located, ABS census data from the 2021 census on income was applied to the areas.

Qualitative analysis

To identify if barriers to usage are spatial or non-spatial a survey was udertaken using the Qualtrics survey platform. The platform asked random survey participants a series of questions on knowledge and usage of car sharing services located within walking distance (400m). The questions were based on a study by Rodier et al (2021). However an additiional question that was not in the 2021 study was included, which asked survey participants if they preferred car ownership to car sharing.

Also, two questions on the future demand for car sharing services similar to the survey questions found in Loose et al (2006) were included in the survey.

Participants who were under 18 years old or did not hold a drivers licence were screened out of the survey.
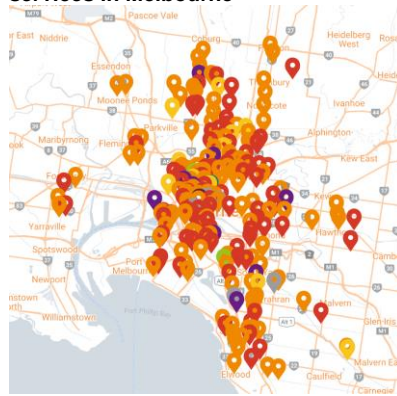
Melbourne

Melbourne is the capital city of Victoria and has a population of 4.98 million as at June 2021 (Australian Bureau of Statistics (ABS) 2021). It is serviced by a train, bus and tram network. The train network services mainly the inner and middle suburbs, the tram network services the inner suburbs and the bus network services the middle and outer suburbs (Currie & Delbosc 2011).

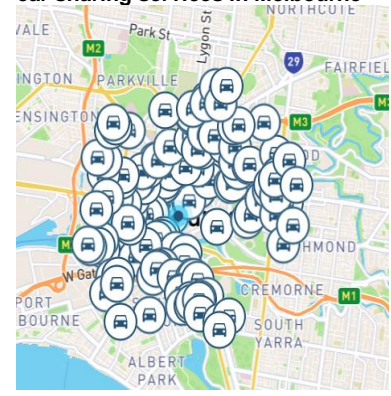**Figure 1: Location of GoGet car sharing services in Melbourne**
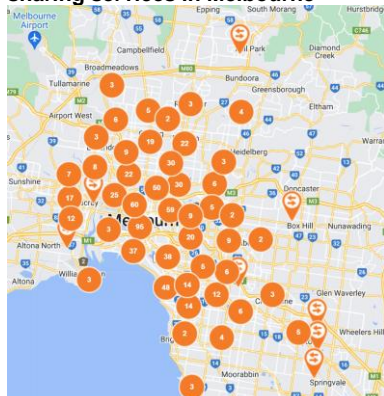
Source: www.goget.com.au/melbourne

Figure 2: Location of Flexicar sharing services in Melbourne

Source: flexicar.com.au

Figure 3: Location of CarNextDoor car sharing services in Melbourne

Source: www.carnextdoor.com.au

Figures 1, 2 and **3** show the location of vehicles of car sharing services GoGet, Flexicar and CarNextDoor in Melbourne. The location of the majority of these services are in the CBD and surrounding, high density and/or middle to high income inner suburbs. CarNextDoor is a peer-to-peer service and is not part of this study, but the location was included for illustration of the level of service available in the Melbourne area.

The lower income regions of Melbourne where a few car sharing services are provided are the west and north west suburbs, and the south east suburbs. These areas are also relatively high density – the ABS's statistical area 4 data estimates the region west of Melbourne has a population of 0.868 million; north west of Melbourne has a population of 0.430 million; and south east of Melbourne has a population of 0.883 million (Australian Bureau of Statistics 2020).

The mean and median total income (excluding government pension and allowances) is: $59 928 and $51 497 for the ABS statistical area 4 region west Melbourne; $60 011 and $50 874 for the region north west of Melbourne; and $56 481 and $48 000 for the region south east Melbourne (Australian Bureau of Statistics 2019).

This paper uses the areas west and north west of Melbourne and south east of Melbourne as case studies to analyse the demand for car sharing services in low income, high density areas. The premise is if the car sharing service is in close proximity then there is the potential for it to be used, especially in low-income areas, where accessibility to the public transport system is lower compared to high income areas. Given these areas are high density, one would expect for-profit car sharing services to be in good supply in west, north west and south east of Melbourne.
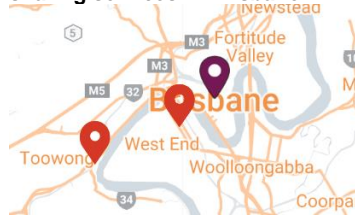
Brisbane

Brisbane is the capital city of Queensland and has a population of 2.57 million as at 2021 (Australian Bureau of Statistics 2021). Brisbane is serviced by a ferry, train and bus network. The bus network services the inner and middle suburbs. The train system is concentrated around the CBD and used for CBD transit however, cars are the most common mode of travel into the city (Yang et al 2017).

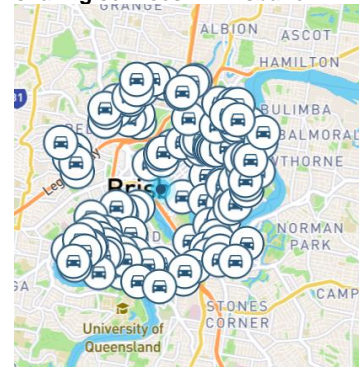**Figure 4: Location of GoGet car sharing services in Brisbane**
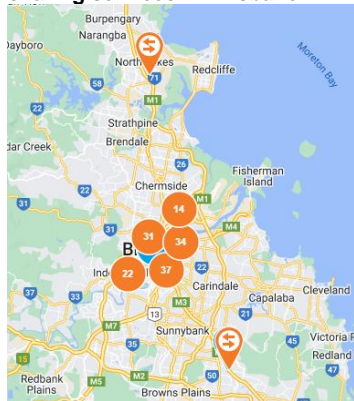
Source: www.goget.com.au/suburb/brisbane-cbd

Figure 5: Location of Flexicar sharing services in Brisbane

Source: flexicar.com.au

Figure 6: Location of CarNextDoor car sharing services in Brisbane


Source: https://www.carnextdoor.com.au

In Brisbane, similar to Melbourne, the majority of car sharing services offered by GoGet, Flexicar and CarNextDooor are located in the CBD or surrounding inner suburbs as shown in **Figures 4, 5 and 6**. These suburbs are also high density and income.

Survey Results – Melbourne (N=263)

- ## Demographics

Figures 6 and 7 summarise the age of the survey participants in Melbourne and how they describe themselves. Most of the responses were from 25-34 years old (90 responses) followed by 18-24 years old (64 responses). 197 of the 263 survey responses were from females.

Figure 6 Age of survey participants
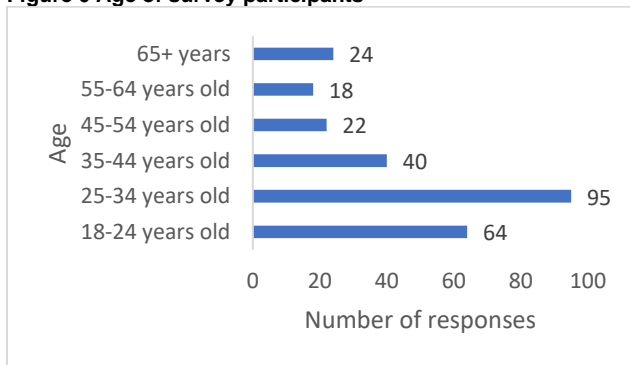
N=263

Figure 7 How would you describe yourself?
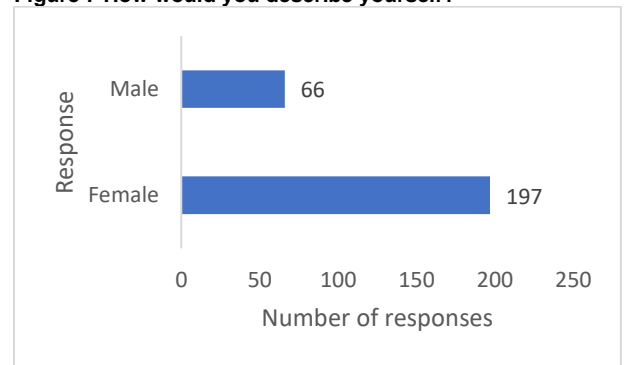
N=263

Figure 8

What is the highest level of education you have completed?
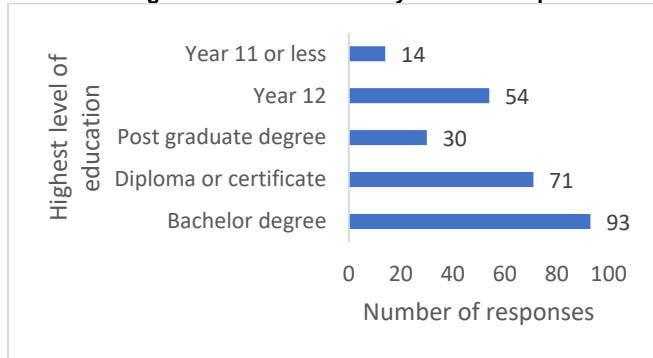
N=263

Figure 9

**Including yourself how many people live in the household?**
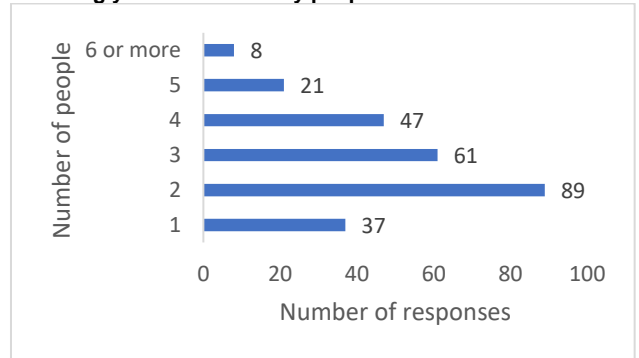
N=263

The highest level of education completed was a bachelor degree with 93 responses, followed by diploma or certificate at 71 responses (**Figure 8**). Most of the respondents were living in a household of two (89 responses), with a household of three the next largest (61 responses – **Figure 9**).
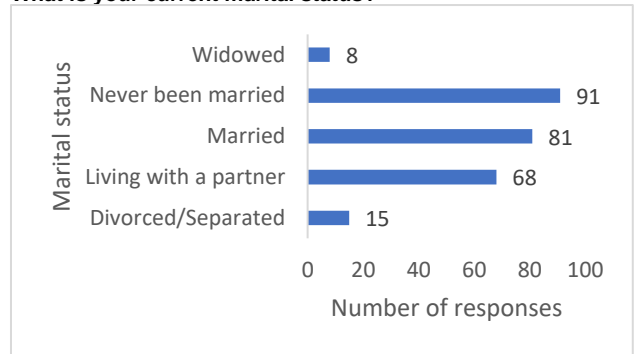
Figure 10

Which of the following best describes your ancestry?
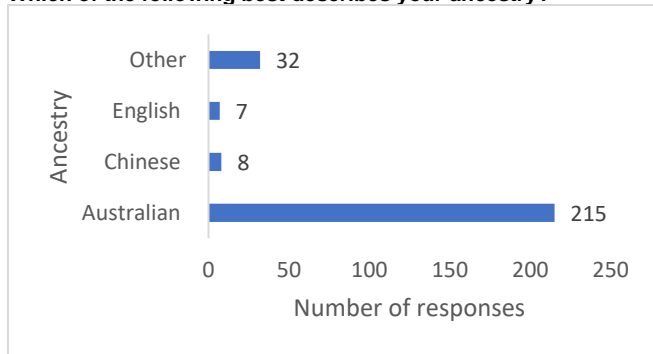
N=263

Figure 11

What is your current marital status?

N=263

215 of the survey respondents identified themselves as Australians (**Figure 10**). Most had never been married (91 responses), with the next highest response were from those that are married (81 responses - **Figure 11**). Most of the respondents were working full time (143 responses) or part-time (58 responses – **Figure 12**)
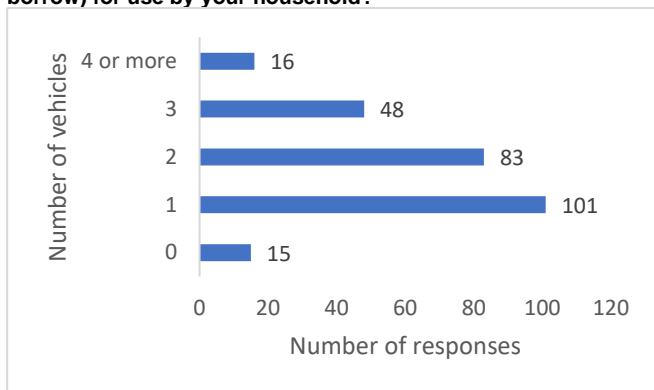
Figure 12

What best describes your employment status over the last three months*
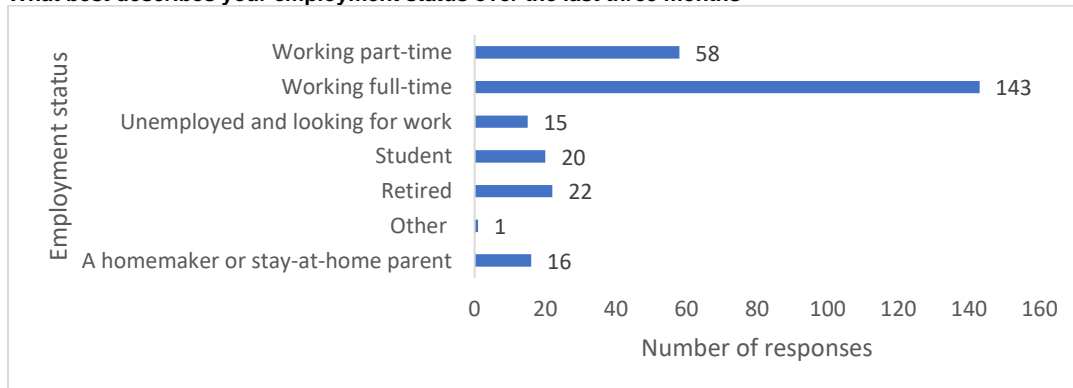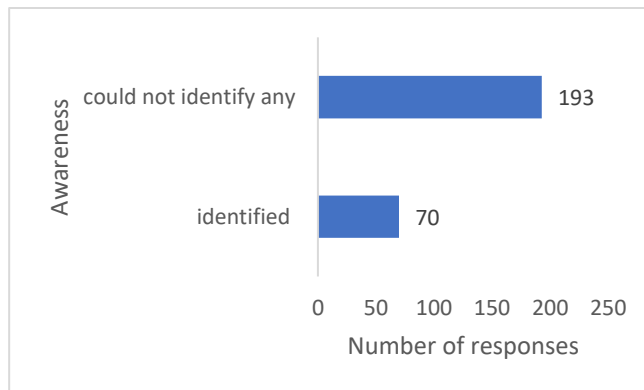

* Multiple options allowed

Figure 13

How many vehicles are available (owned, leased, or regularly borrow) for use by your household?

N=263

Figure 14

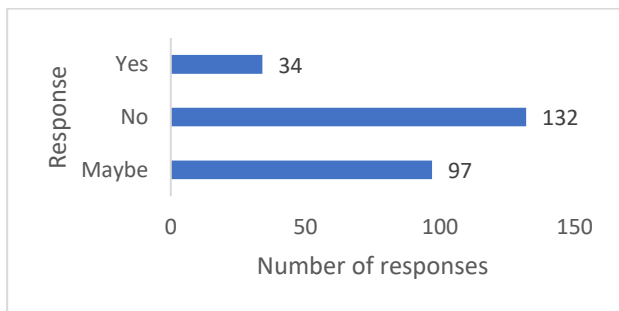**Can you list any car sharing services?**

N=263

Car ownership was high among the respondents, with 101 survey respondents owning one car and 83 owning two cars (**Figure 13**). Only 70 could identify a car sharing service. 193 survey respondents either could not identity or incorrectly identified (**Figure 14**).

- **Demand and non-spatial barriers to car sharing services**

The next set of questions identifies the demand for car sharing services located within walking distance (400m) and non-spatial barriers to access and usage.
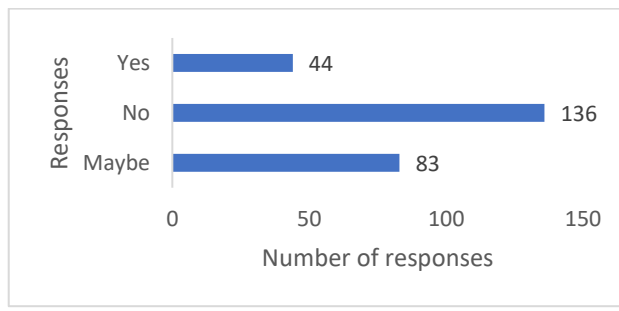
Figure 15

Assuming a car sharing service such as GoGet or Flexicar is near you place of residence (located up to 400m), would you not own a car and use the car sharing service?

N=263

Figure 16

Will the car sharing service such as GoGet or Flexicar increase the number of trips your household makes if it was located within walking distance (up to 400m)?


N=263

132 survey respondents preferred to own a car even if a car sharing service was located within walking distance (400m). Interestingly, 97 considered not owning a car, and 37 responded that they would not own a car (**Figure 15**). When asked if the car sharing service will increase the number of trips the household would make, the responses were similar – 136 responded 'No', 83 responded with 'Maybe" and 44 responded 'Yes' (**Figure 16**).
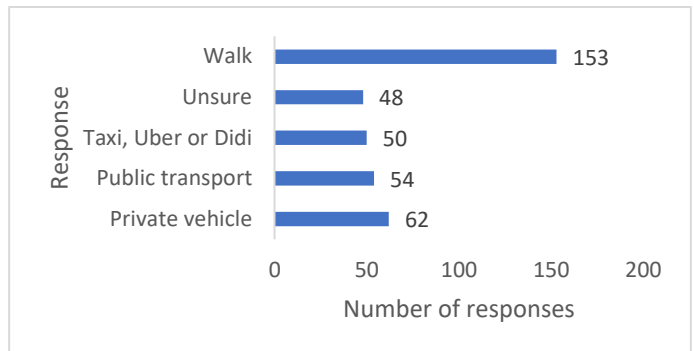
Figure 17

For these new trips that the car sharing service such as GoGet or Flexicar allows you to make, where will you go?*
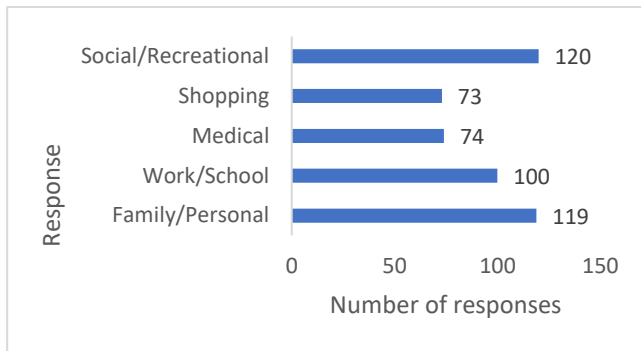
* Multiple options allowed

Figure 18

**How do you think you will most frequently travel to pick up the car share vehicle?***

* Multiple options allowed

Most of the new trips that a car sharing service allows one to make was between social/recreational use (120 responses) and family/personal use (119 responses). However, use for work/school purposes was the next highest (100 responses), followed by medical (74 responses) and shopping (73 responses – **Figure 17**). Walking to pick up the car share vehicle was the most preferred mode of transport (153 responses – **Figure 18**).

The next set of questions asked if joining a car share service was considered, 118 respondents had not considered joining but was open to the idea, 68 were unsure about joining, 37 were interested but had not taken any steps to join and 25 had started to gather information. Only 8 respondents thought the service was too expensive and 7 were members of car sharing services (**Figure 19**).

Figure 19

Have you considered joining a car sharing service such as GoGet or Flexicar?
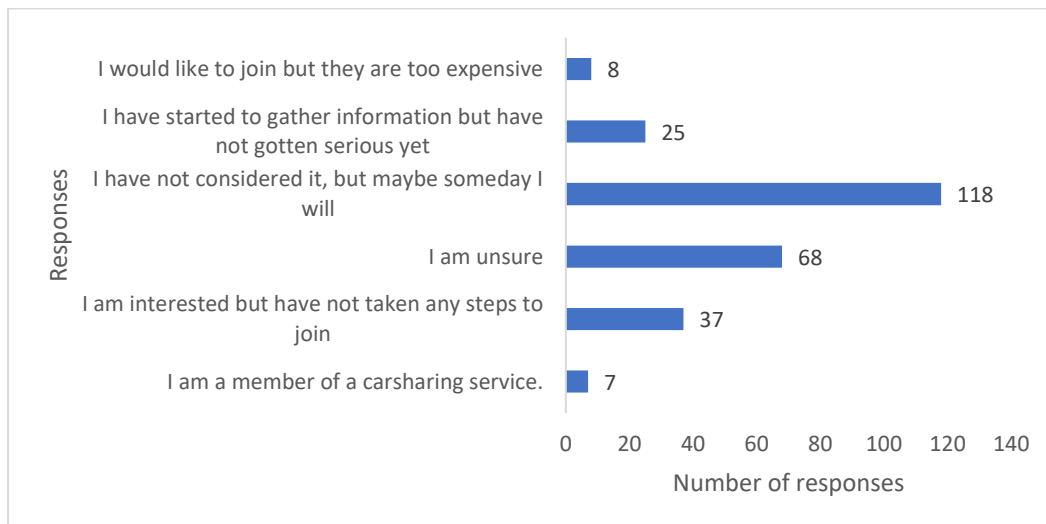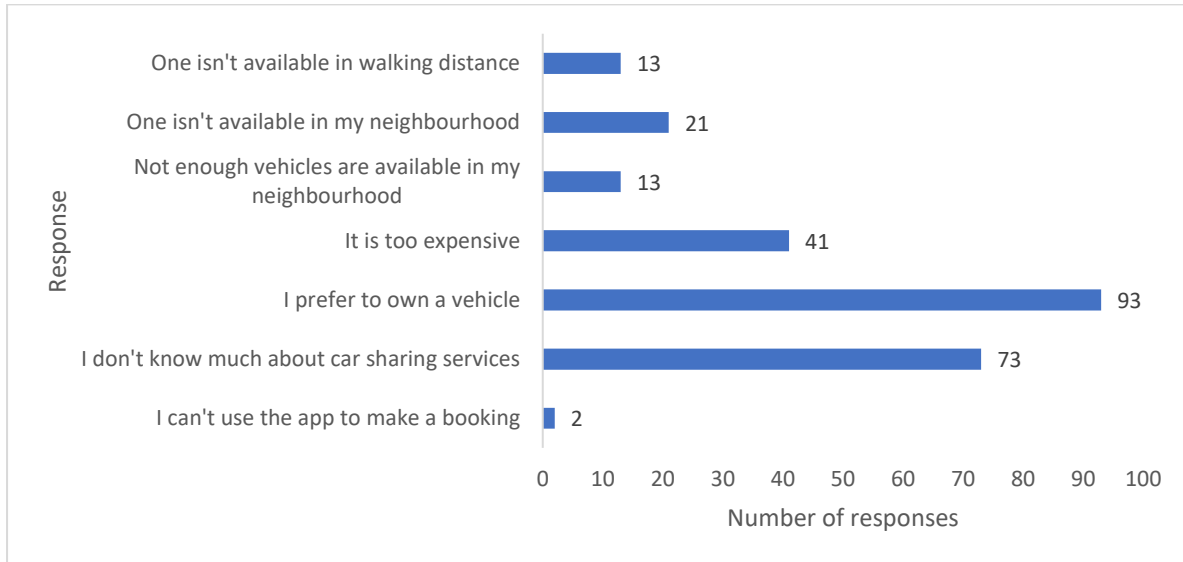

N=263

When asked why they hadn't joined a car sharing service, 93 preferred to own a car, 73 didn't know much about car sharing services, 41 thought it too expensive (which is significantly more than the responses from the previous question in **Figure 19**. However, this was about the same or slightly lower as the total responses on the supply of car sharing services (47 responses in total) – 13 responded with one isn't available within walking

distance, 21 noted that one isn't available in the neighbourhood, and 13 responded with there isn't enough vehicles in the neighbourhood (**Figure 20**).

Figure 20

Which one of the following best describes the reasons for not joining car sharing services such as GoGet and Flexicar?
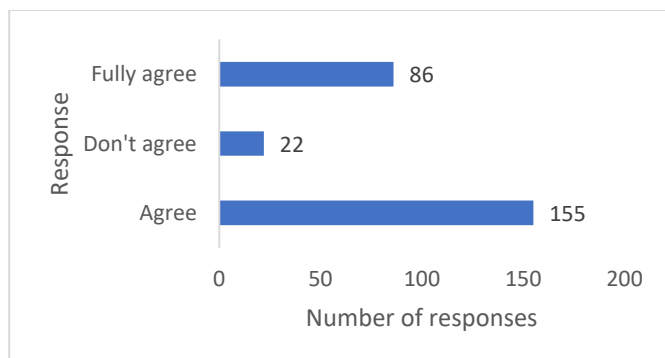

N=263

Questions on the future of car sharing services indicate that there is strong latent demand in the future of the services. 155 responses agree and 86 responses fully agree that they are innovative services, as opposed to 22 who don't agree (**Figure 21**).

The strong latent demand is more clearly demonstrated in the responses to whether the car sharing service is a good alternative to owning a car. 147 responses agreed and 71 responses fully agreed, with 45 responses not agreeing (**Figure 22**).
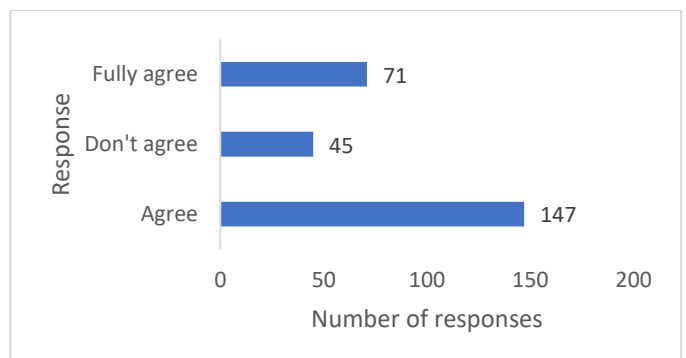
Figure 21

Car sharing services such as GoGet and Flexicar are innovative services

N=263

Figure 22

Car sharing through services such as GoGet and Flexicar is a good alternative to owning a car

N=263

The next two case studies, analyses the survey responses to the suburbs west and north west of Melbourne, and south east of Melbourne.
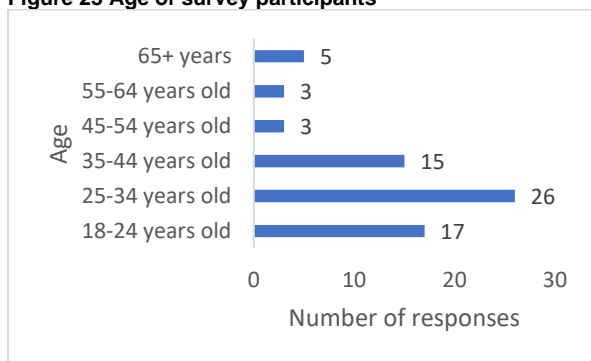
West and North West of Melbourne

The west and northwest inner suburbs of Melbourne (ABS statistical areas 4) have a population density that should be attractive to for-profit car sharing providers. However, the median income indicates that areas are lower socio-economic status.

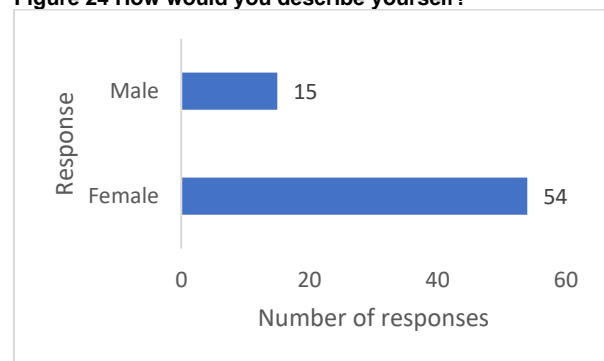**Survey Results – West and North West of Melbourne (N=69)**

- **Demographics**

Figure 23 Age of survey participants

N=69

Figure 24 How would you describe yourself?

N=69

The age of survey respondents for in the region west and north west of Melbourne were mostly in the 18-44 years range. 26 responses were from 25-34 years old, followed by 18-24 years old (17 responses) and 35-44 years old (15 responses), which were similar in number (**Figure 23**). Similar to the responses for Melbourne, most of the survey participants were females (54 responses – **Figure 24**).
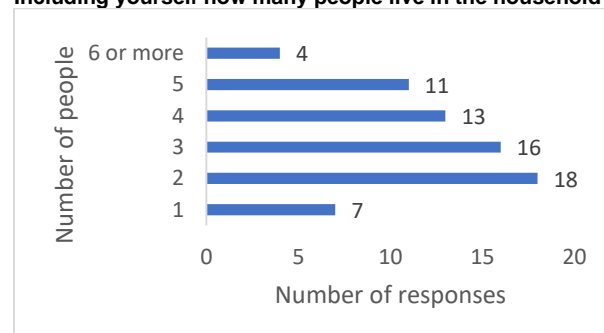
Figure 25

What is the highest level of education you have completed?
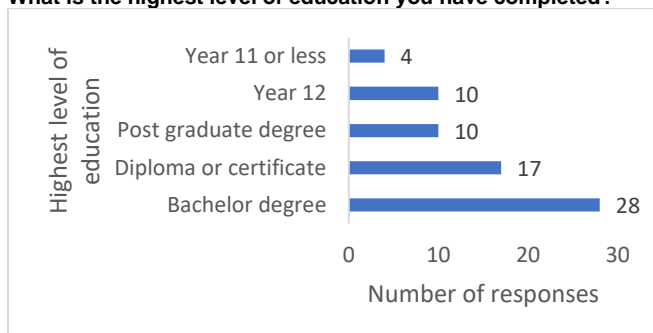
N=69

Figure 26

Including yourself how many people live in the household?


N=69

The highest level of education completed was a bachelor degree (28 responses) followed by diploma or certificate (17 responses – **Figure 25**). There were larger households compared to the responses for all of Melbourne – 18 responses were from 2 person household, 16 from 3 person household, 13 from 4 person household, 11 from 5 person household and 4 from 6 or more households (**Figure 26**).

Similar to the whole of Melbourne respondents most identified as Australian (54 responses – **Figure 27**), but the marital status was evenly spread between 'never been married', 'married' and 'living with a partner', each with 21 responses (**Figure 28**).
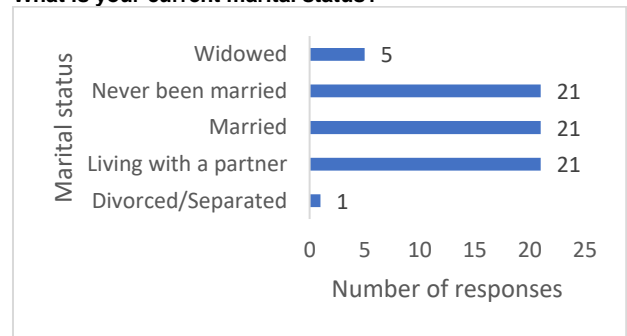
Figure 27

Which of the following best describes your ancestry?
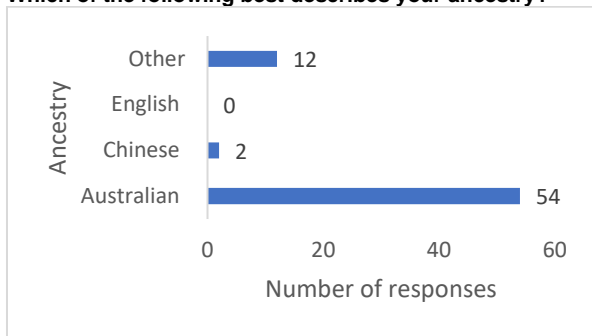
N=69

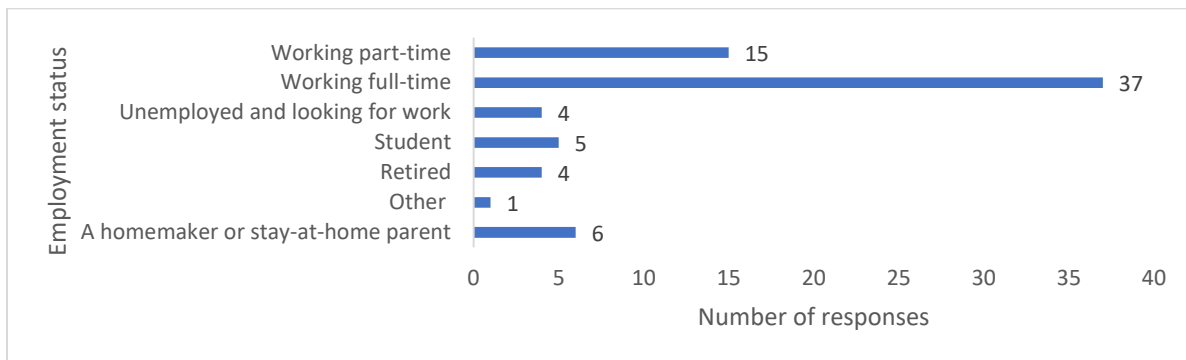Figure 28

What is your current marital status?

N=69

37 of the respondents were working full-time and 15 working part-time (**Figure 29**).

Figure 29

**What best describes your employment status over the last three months?***

*Multiple options allowed

- **Demand and non-spatial barriers to car sharing services**

The next few questions are on the demand for car sharing services and barriers to access and usage. 28 respondents had one vehicle, 16 respondents had two vehicles, and 13 and 9 respondents had 3 or 4 or more vehicles. Only 3 had no vehicle (**Figure 30**).
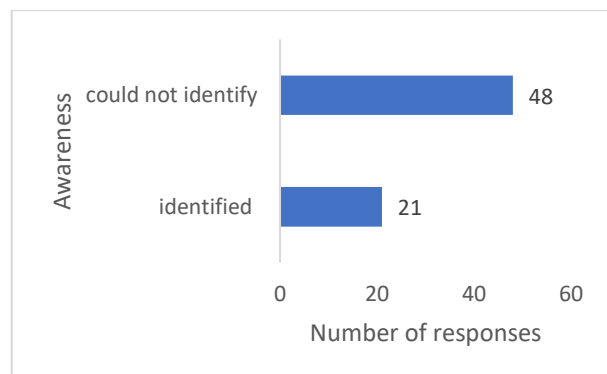
Figure 30

How many vehicles are available (owned, leased, or regularly borrow) for use by your household?
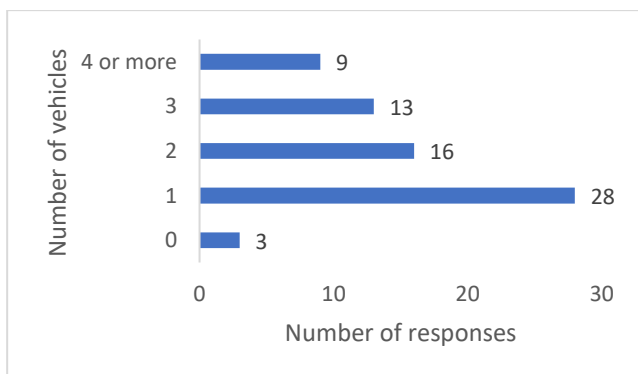
N=69

Figure 31

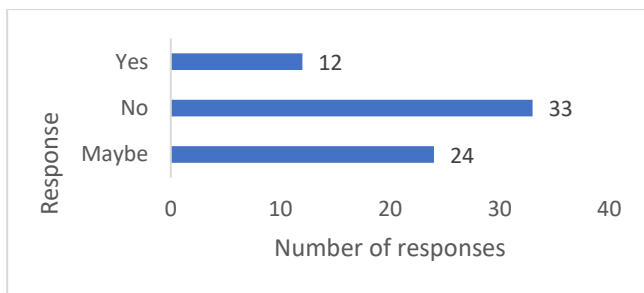**Can you list any car sharing services?**

N=69

Most of the respondents either could not identify or incorrectly identified car sharing services (48 responses), compared to 21 respondents that correctly identified a service (**Figure 31**).

The survey results on questions on latent demand indicated a strong potential demand for car sharing services in this region. 33 respondents prefer to own a car even if a car sharing service was located within walking distance. However, proportionately more may not own a car (24 responses) and 12 would not own a car if a service was located within walking distance (**Figure 32**). Similar results when asked if a car sharing service located within walking distance would increase the number of trips the household makes (**Figure 33**).
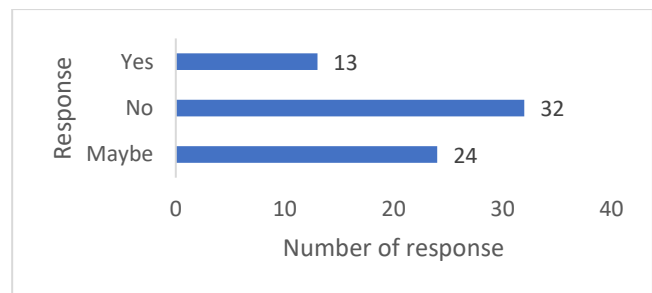
Figure 32

Assuming a car sharing service such as GoGet or Flexicar is near you place of residence (located up to 400m), would you not own a car and use the car sharing service?

N=69

Figure 33

Will the car sharing service such as GoGet or Flexicar increase the number of trips your household makes if it was located within walking distance (up to 400m)?

N=69

Most of the new trips the car sharing service would be used for were family/personal (32 responses), followed closely be work/school, shopping and medical (**Figure 34**). Walking was the preferred mode to pick up the car sharing service (**Figure 35**).

Figure 34

For these new trips that the car sharing service such as GoGet or Flexicar allows you to make, where will you go?*
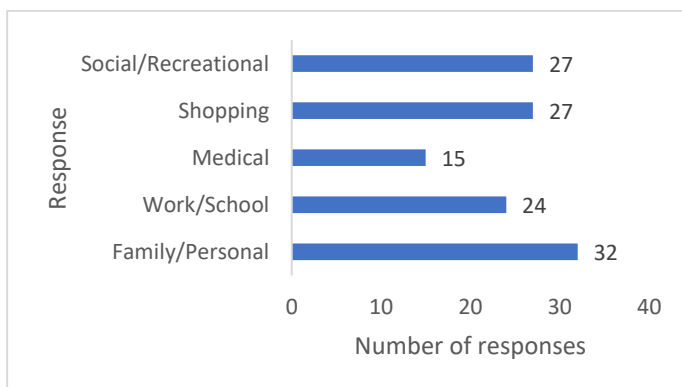
*Multiple options allowed

Figure 35

How do you think you will most frequently travel to pick up the car share vehicle?*

*Multiple options allowed

Figure 36

Have you considered joining a car sharing service such as GoGet or Flexicar?

N=69

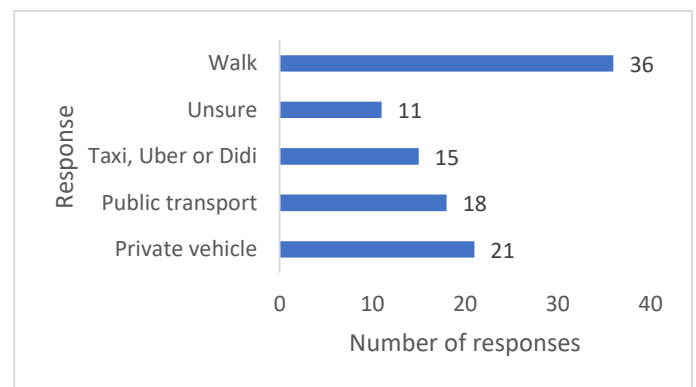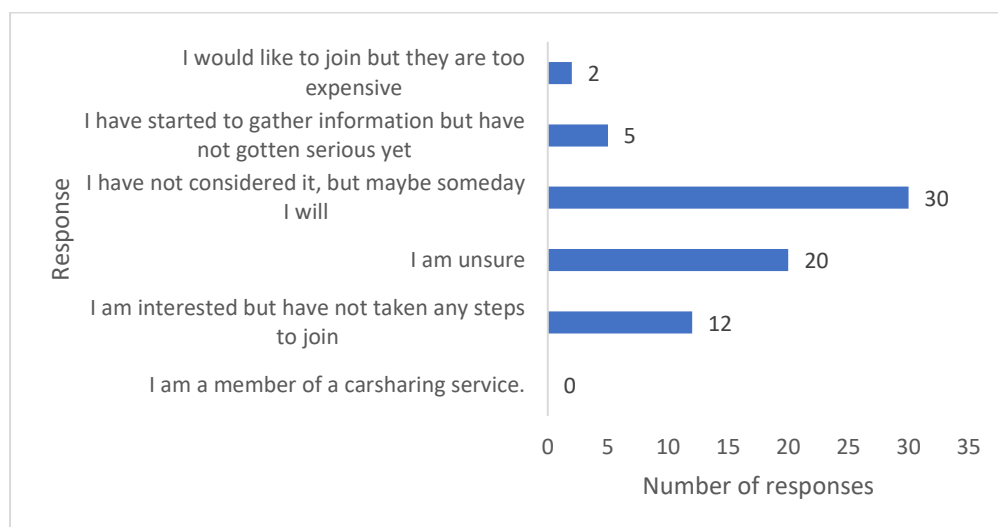30 respondents had not considered joining a car sharing service but may consider it in the future, 20 were not sure, and 12 were interested by had not taken any steps to join (**Figure 36**). Most perferred to own a vehicle (27 responses), 16 did not know much about car sharing services and 10 thought it was too expensive to join. However, in total 15 responses highlighted that they had not joined a service because of a lack of supply, including within walking distance (**Figure 37**). This was slightly higher than the response on the cost of car sharing services being too expensive.

Figure 37

Which one of the following best describes the reasons for not joining car sharing service such as GoGet and Flexicar?
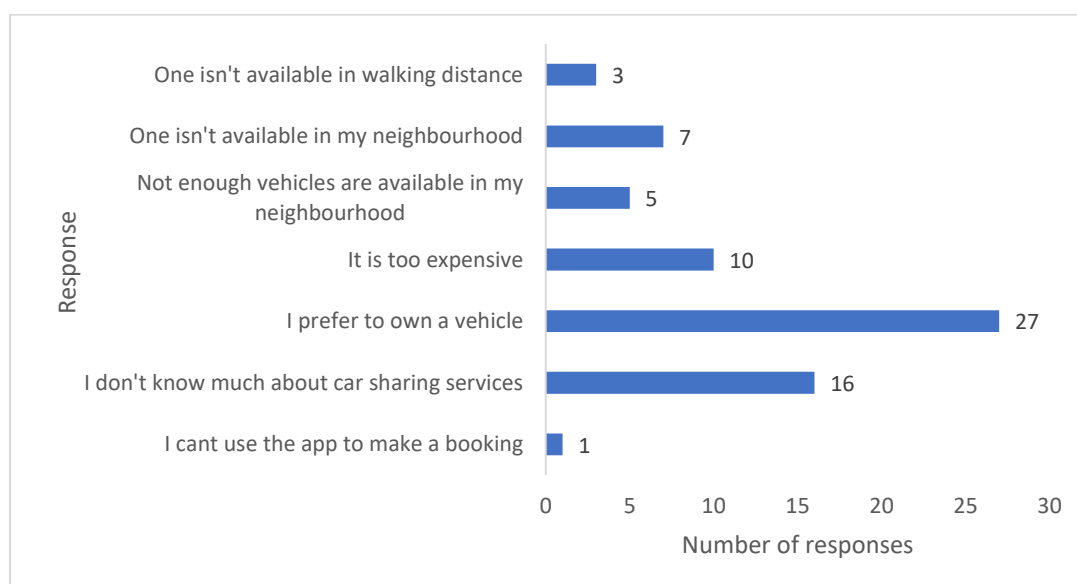
N=69

On the future demand for car sharing services, 38 responses agreed the services were innovative and 26 fully agreed, only 5 did not agree (**Figure 28**). In addition, 40 responses

agreed that car sharing services were a good alternative to owning a car, and 21 respondents fully agreed, only 8 did not agree (**Figure 29**).
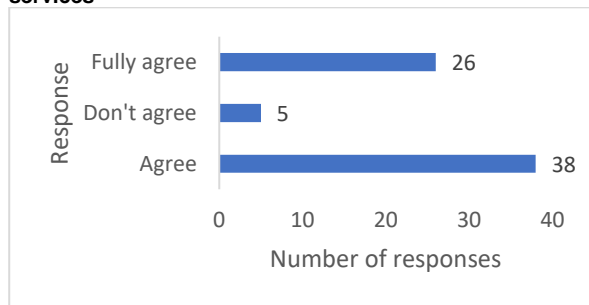
These responses indicate a strong latent demand for car sharing services in the west and north west region of Melbourne.
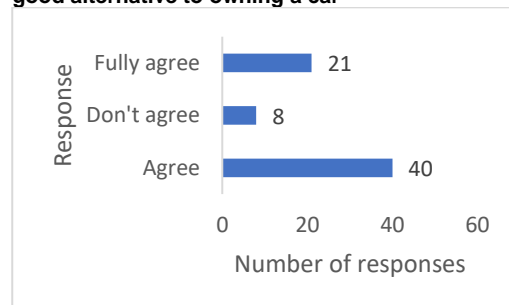
Figure 38

Car sharing services such as GoGet and Flexicar are innovative services

Fully agree 26
Don't agree 5
Agree 38

Number of responses

N=69

Figure 39

Car sharing through services such as GoGet and Flexicar is a good alternative to owning a car

Fully agree 21
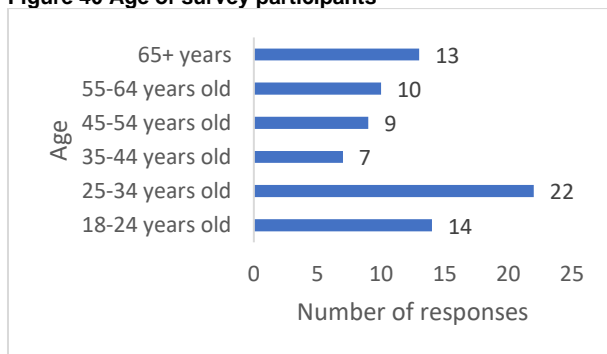Don't agree 8
Agree 40

Number of responses

N=69

Survey results – south east of Melbourne (N=75)

The inner city suburbs of south east Melbourne (ABS statistical area 4) also supports a population density that lends itself suitable for car sharing services. As noted above, comparatively, the income levels a lower than for the other areas of Melbourne where car sharing services are available.

- **Demographics**

There is a wider range of older survey participants from the south east of Melbourne region – 22 are 25-34 years old and 14 are 18-24 years old, however, 13 were 65+ years (Figure 40). Similar to the other regions, most of the respondents were female (53 responses - **Figure 41**).

Figure 40 Age of survey participants

65+ years 13
55-64 years old 10
45-54 years old 9
35-44 years old 7
25-34 years old 22
18-24 years old 14

Number of responses

N=75

Figure 41 How would you describe yourself?

Male 22
Female 53

Number of responses
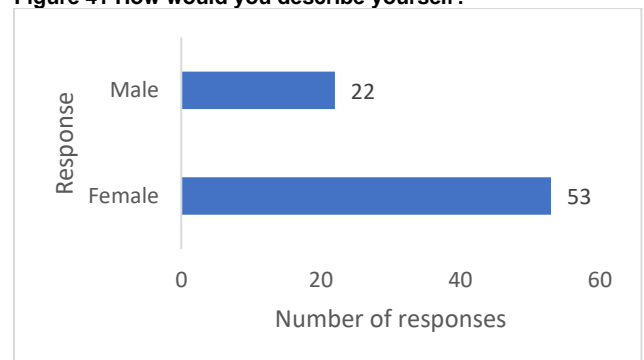
N=75

The highest level of education completed was a diploma or certificate (24 responses), followed by a bachelor degree (**Figure 42**). Most households have two people, by single, three and four people households (**Figure 43**).

Figure 42

What is the highest level of education you have completed?

N=75

Figure 43

Including yourself how many people live in the household?
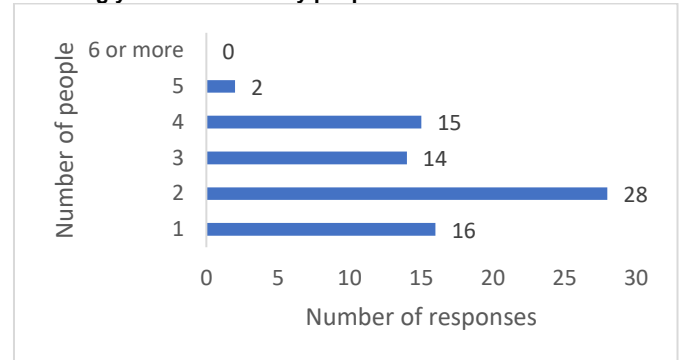
N=75

Ancestry was mostly Australian (65 responses – **Figure 44**), with 29 respondents married, 22 never been married and 15 living with a partner (**Figure 45**).

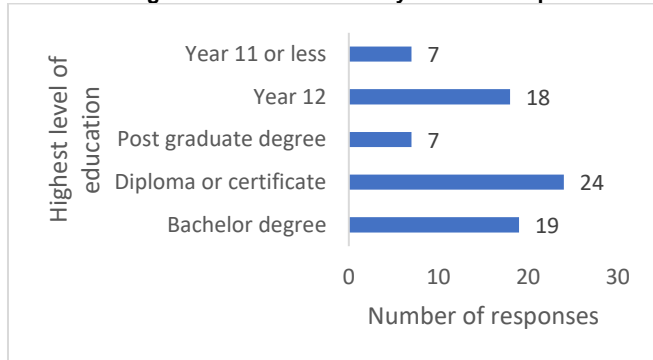**Figure 44**

Which of the following best describes your ancestry?
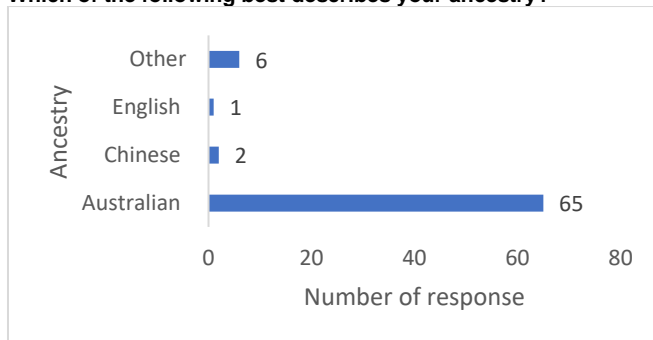
N=75

Figure 45

What is your current marital status?
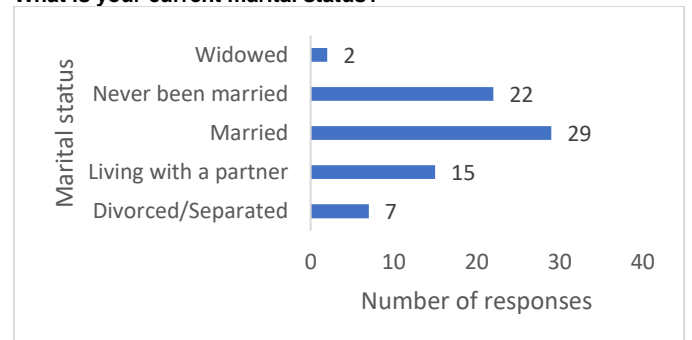
N=75

Similar to the other regions, most of the respondents are working full-time (38 responses), followed by part-time (16 responses) then retirees (10 responses).

Figure 46

What best describes your employment status over the last three months?*
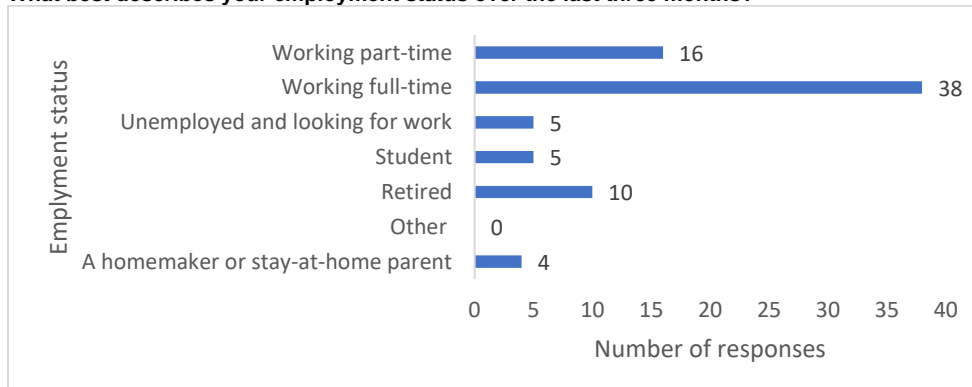
*Multiple options allowed

Households have mostly one (32 responses) or two vehicles (27 responses – **Figure 47**). A larger proportion of respondents compared to other regions incorrectly identified or could not

identify car sharing services (61 responses). 14 respondents could identify a car sharing service (**Figure 48**).

Figure 47

How many vehicles are available (owned, leased, or regularly borrow) for use by your household?
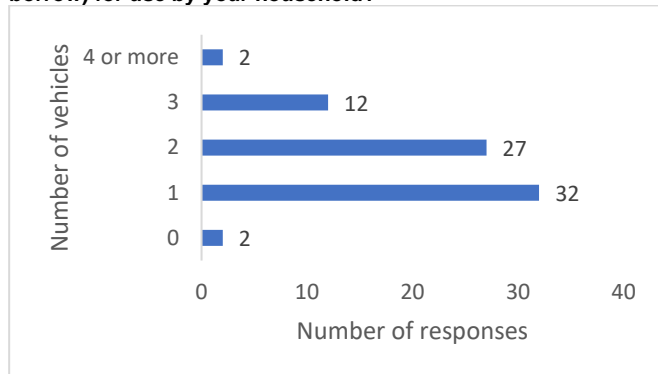
N=75

Figure 48

Can you list any car sharing services?
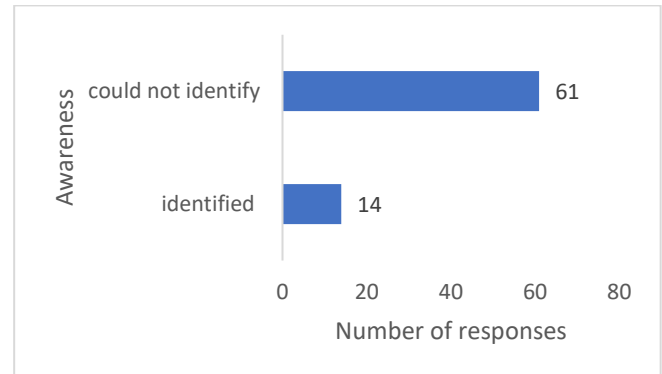
N=75

- **Demand and non-spatial barriers to car sharing services**

The next set of questions were on demand for car sharing services and non-spatial barriers to access and usage. A larger proportion of respondents would continue to own a car if a car sharing service was located within walking distance (400m) compared to the other regions (47 responses). 22 responses considered not owning a car and 6 respondents would not own a car (**Figure 49**). These responses were consistent with the responses to the question on whether a car sharing service would increase number of trips – 51 respondents answered 'No', 15 'Maybe" and 9 answered 'Yes' (**Figure 50**).

Figure 49

Assuming a car sharing service such as GoGet or Flexicar is near you place of residence (located up to 400m), would you not own a car and use the car sharing service?
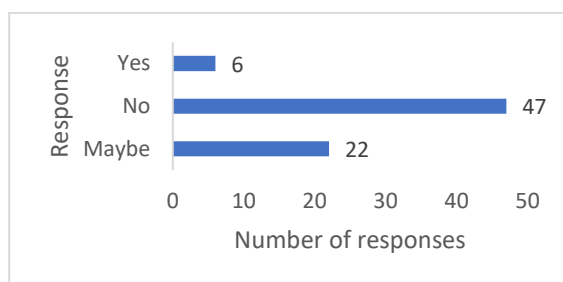
N=75

Figure 50

Will the car sharing service such as GoGet or Flexicar increase the number of trips your household makes if it was located within walking distance (up to 400m)?
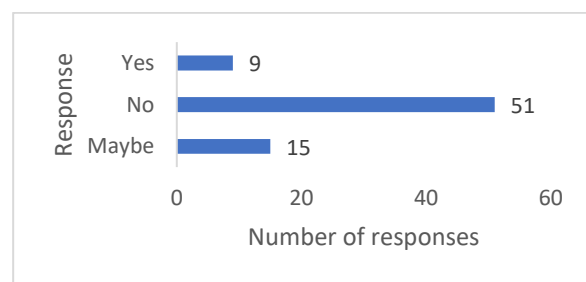
N=75

The responses on the use of car sharing services varied from the other regions. Shopping/Recreational and Family/Personal had 36 responses each, and the remaining responses – shopping, medical and work/school have similar number of responses (**Figure 51**). Similar to the other regions, walking to the car sharing service was the most popular mode of transport (35 responses – **Figure 52**).

Figure 51

For these new trips that the car sharing service such as GoGet or Flexicar allows you to make, where will you go?*
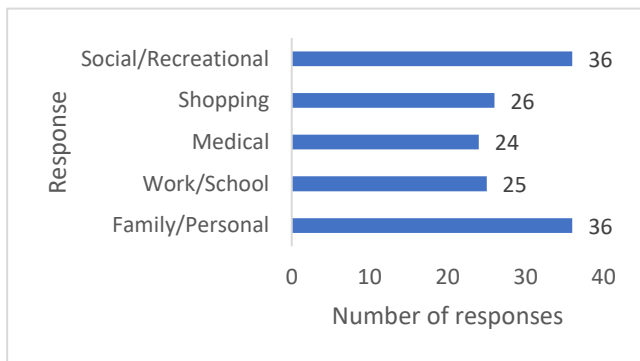
*Multiple options allowed

Figure 52

How do you think you will most frequently travel to pick up the car share vehicle?*
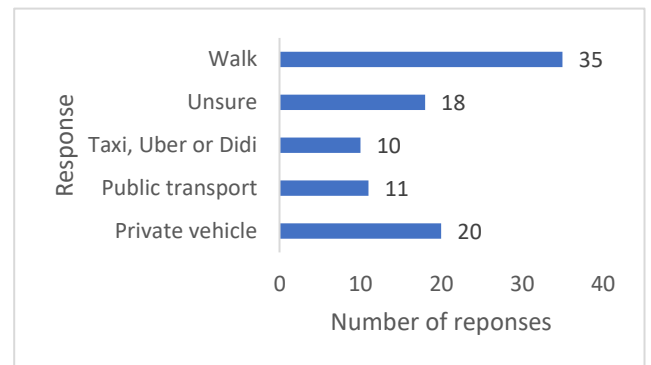
*Multiple options allowed

Responses to the question on whether the person considered joining a car sharing service were similar to the other regions – 32 responses had not considered it, but maybe someday they will, followed by 26 responses that were unsure (**Figure 53**).

Figure 53

Have you considered joining a car sharing service such as GoGet or Flexicar?
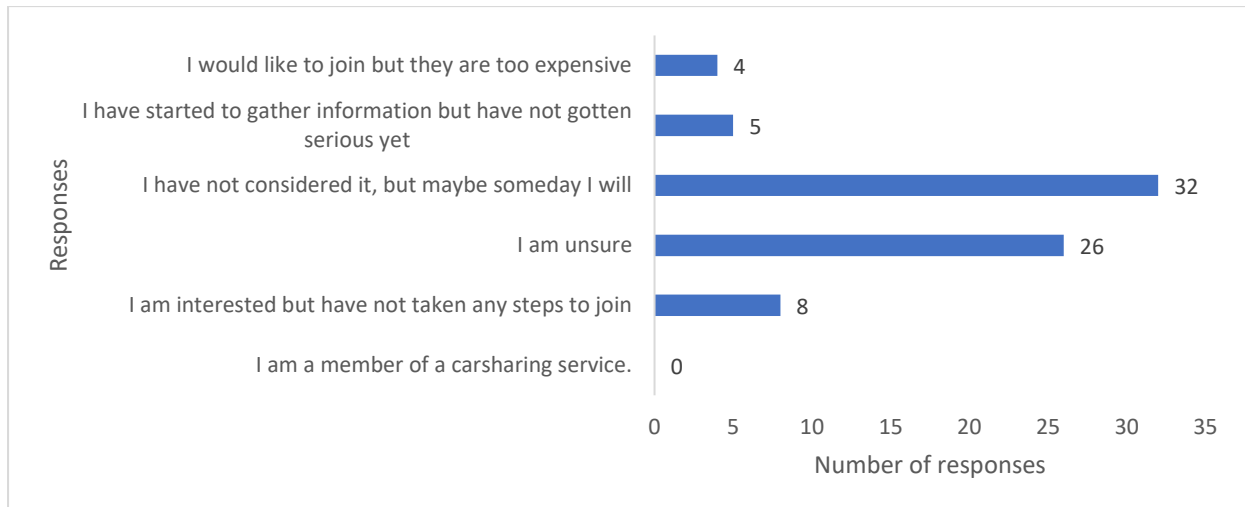
N=75

Similarly, the reasons for not joining a car sharing service was a preference for car ownership (33 responses), followed by a lack of knowledge of car sharing services. 8 respondents thought the service was too expensive and 12 respondents in total did not join due to not enough supply of vehicle, including within walking distance (**Figure 54**).

Figure 54

Which one of the following best describes the reasons for not joining car sharing service such as GoGet and Flexicar?
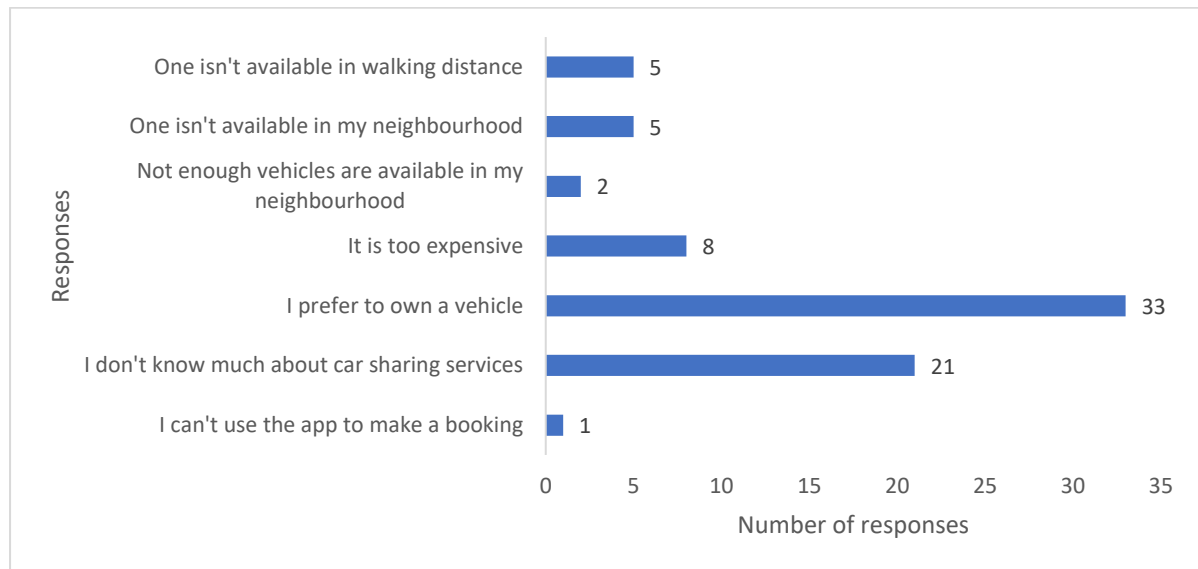
N=75

The future demand for car sharing services appear to be strong – 45 respondents agreed that the service was innovative and 21 fully agreed (**Figure 55**). 40 respondents agreed that car sharing services were a good alternative to owning a car, and 19 responses fully agreed. 16 responses did not agree (**Figure 56**).

Figure 55

Car sharing services such as GoGet and Flexicar are innovative services
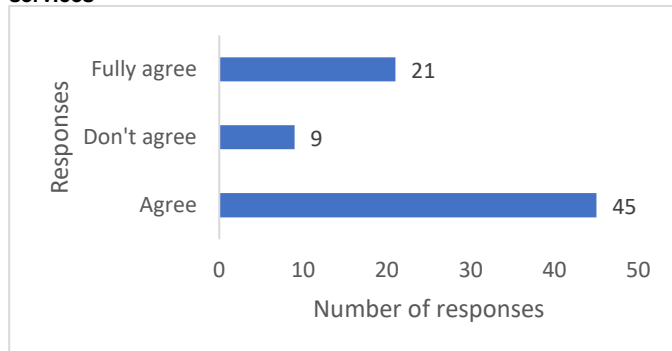
N=75

Figure 56

Car sharing through services such as GoGet and Flexicar is a good alternative to owning a car
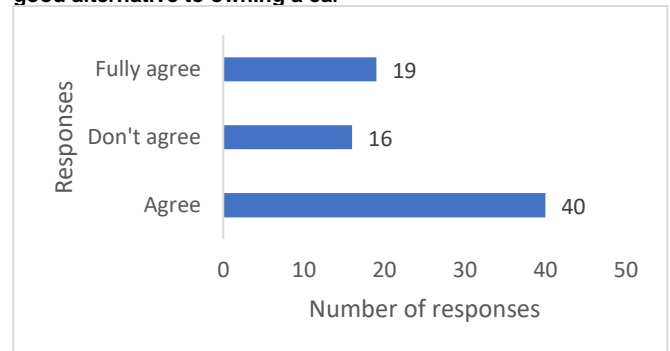
N=75

Similarly, the survey response for the south east of Melbourne indicate a strong latent demand for car sharing services.

Brisbane - Survey results (N=262)

The age of survey respondents were mostly 25-34 years old (73 responses) and 18-24 year olds (62 responses – **Figure 57**). Most of the survey respondents were female (185 responses – **Figure 58**).

- **Demographics**

Figure 57 Age of survey participants
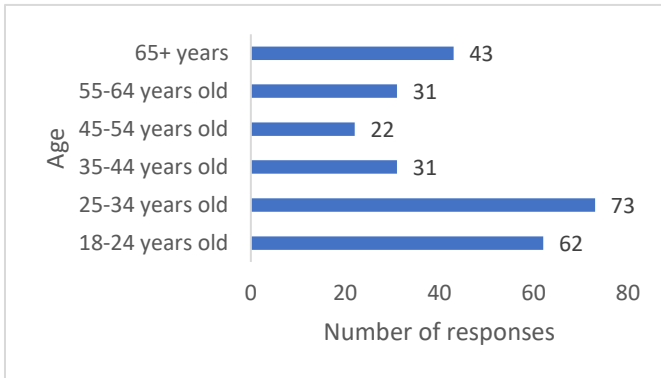
Figure 58 How would you describe yourself?
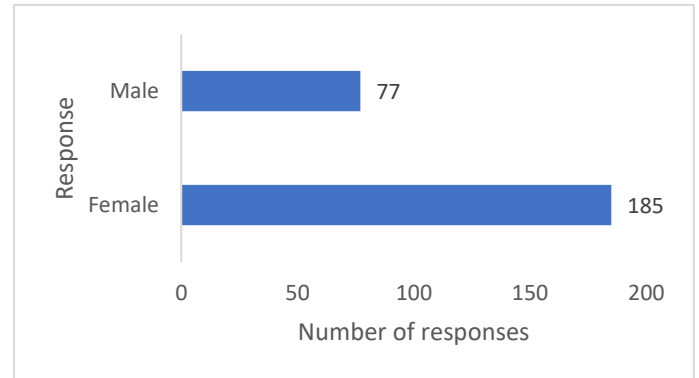
N=262

N=262

The highest level of education was a bachelor degree (70 responses) followed by diploma or certificate (74 responses – **Figure 59**). Two person households were the most common (94 responses), however, 1 person, 3 person and 4 person households (**Figure 60**).

Figure 59

What is the highest level of education you have completed?
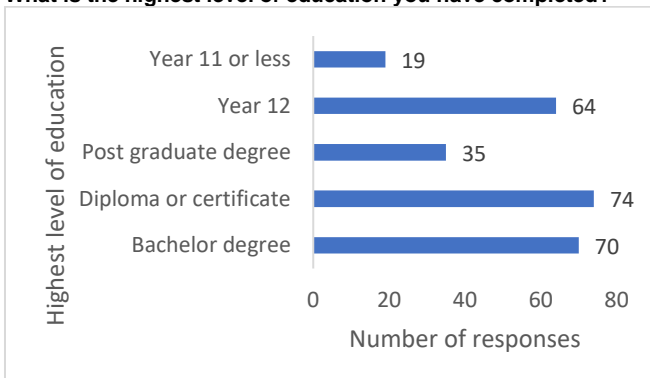
N=262

Figure 60

Including yourself how many people live in the household?
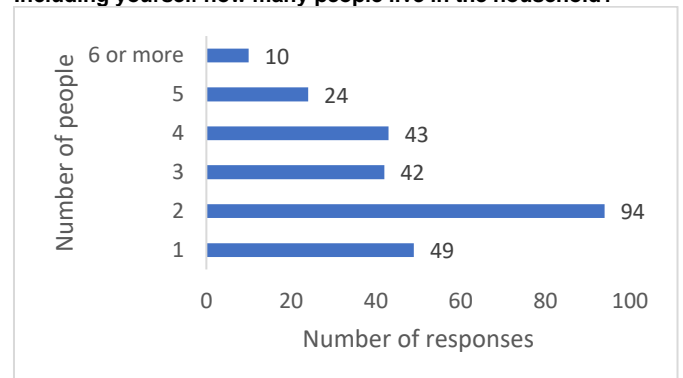
N=262

208 of the respondents identified as Australians (**Figure 61**); 93 respondents were married and 82 never been married (**Figure 62**).

Figure 61

Which of the following best describes your ancestry?
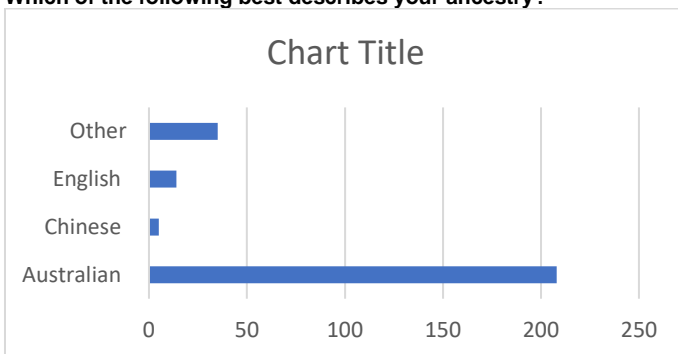
N=262

Figure 62

What is your current marital status?
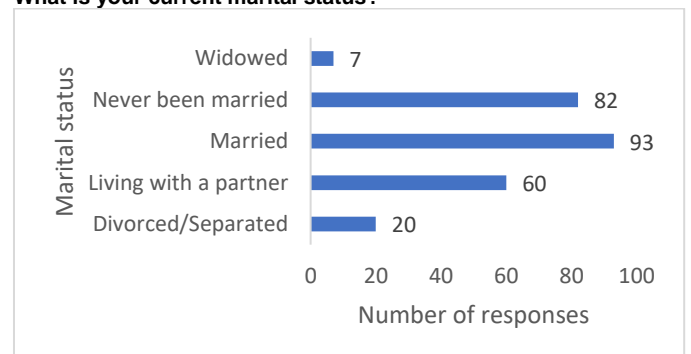
N=262

Full-time (110 responses) and part-time (73 responses) was the employment status of the majority (**Figure 63**).

Figure 63

What best describes your employment status over the last three months?
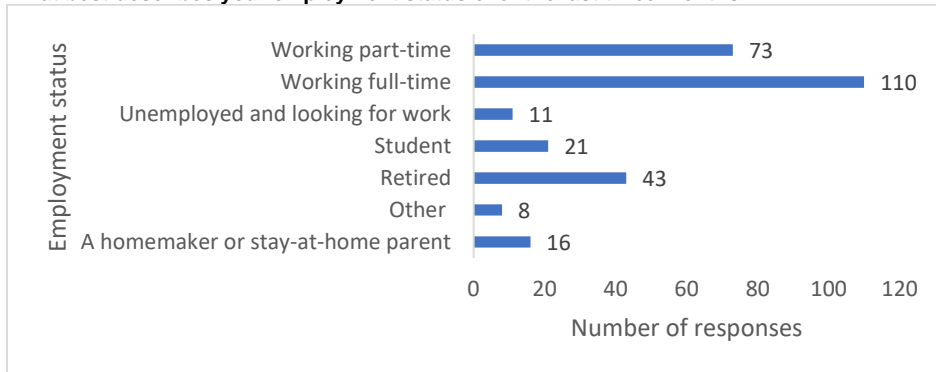
*Multiple options allowed

Similar to most households in Melbourne, the majority of households have one car (105 responses), followed by two car households (80 responses – **Figure 64**). Identification of car sharing services also followed the same trend as Melbourne, 234 incorrectly identified or could not identify a car sharing service and 28 respondents identified a service correctly (**Figure 65**).

Figure 64

How many vehicles are available (owned, leased, or regularly borrow) for use by your household?
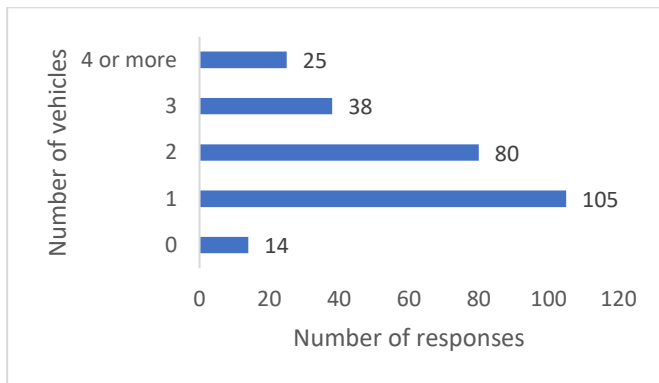
N=262

Figure 65

Can you list any car sharing services?
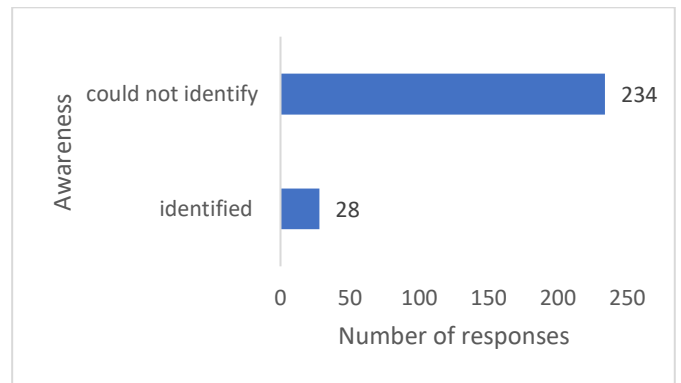
N=262

- **Demand and non-spatial barriers to car sharing services**

Responses to questions on the latent demand for car sharing services were different to the findings in Melbourne. Most responded 'No' to using a car sharing service as opposed to owning a car (129 responses), with 104 responded with 'Maybe' (**Figure 66**). These were closer in response compared to the response for Melbourne on the same question. Additionally on the question of whether a car sharing service will increase the number of trips a household make, a larger proportion responded with "No", compared to the previous question (142 responses), and a smaller proportion responded with 'Maybe' (75 responses – **Figure 67**). A similar number of respondents to Melbourne responded 'Yes' (45 responses).

Figure 66

Assuming a car sharing service such as GoGet or Flexicar is near you place of residence (located up to 400m), would you not own a car and use the car sharing service?
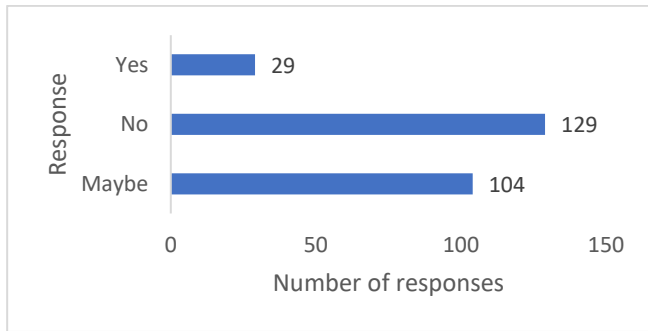
N=262

Figure 67

Will the car sharing service such as GoGet or Flexicar increase the number of trips your household makes if it was located within walking distance (up to 400m)?
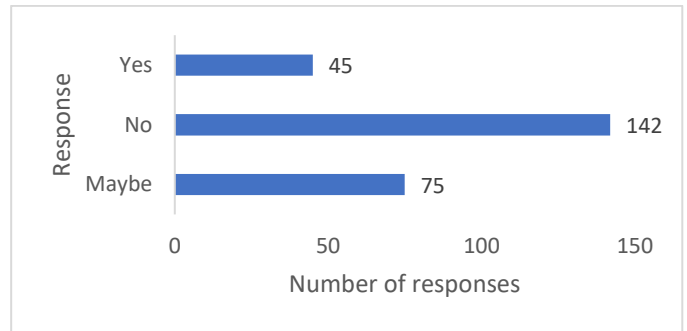
N=262

Social/recreational (120 responses) and family/personal (111 responses) for new trips if a car sharing service was available within walking distance (400m) were similar to Melbourne as the most common responses (**Figure 68**). Walking to the car sharing service was also the preferred mode of travel (115 responses – **Figure 69**).

Figure 68

For these new trips that the car sharing service such as GoGet or Flexicar allows you to make, where will you go?*
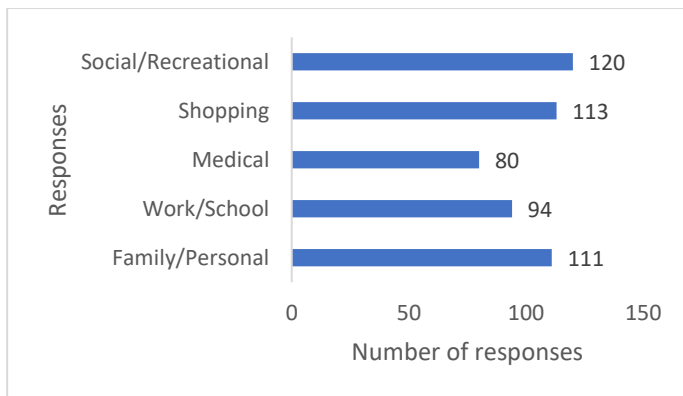
*Multiple options allowed

Figure 69

How do you think you will most frequently travel to pick up the car share vehicle?*
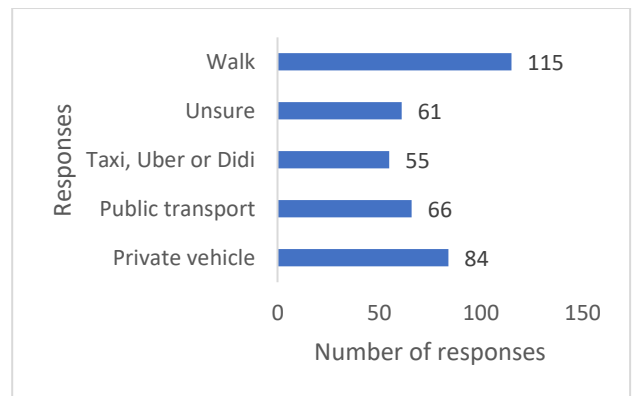
*Multiple options allowed

126 respondents had not considered joining a car sharing service but may some day, 67 are unsure, 40 interested but had not taken any steps, 14 started to gather information but had not gotten serious and 11 considered the services too expensive to join (**Figure 70**).

Figure 70

Have you considered joining a car sharing service such as GoGet or Flexicar?
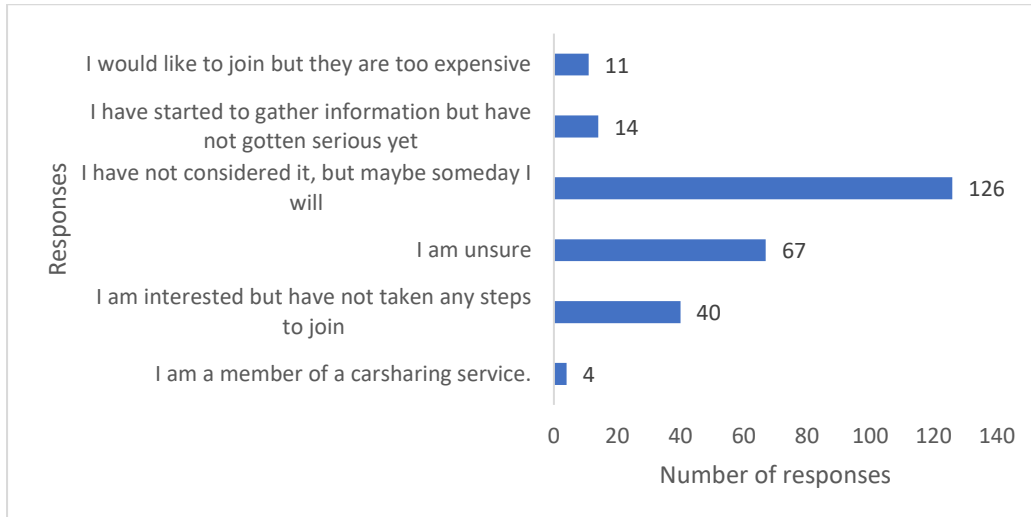
N=262

Interestingly, most preferred to own a car (90 responses), however this was not proportionately as large as the responses in Melbourne. In addition, 83 respondents did not know much about car sharing service and 24 thought it is too expensive. Compared to the total responses on the questions on the supply of car sharing service (60 responses), this was significantly lower than the responses in Melbourne. Hence, the latent demand in Brisbane is possibly higher than in Melbourne.

Figure 71

Which one of the following best describes the reasons for not joining car sharing service such as GoGet and Flexicar?
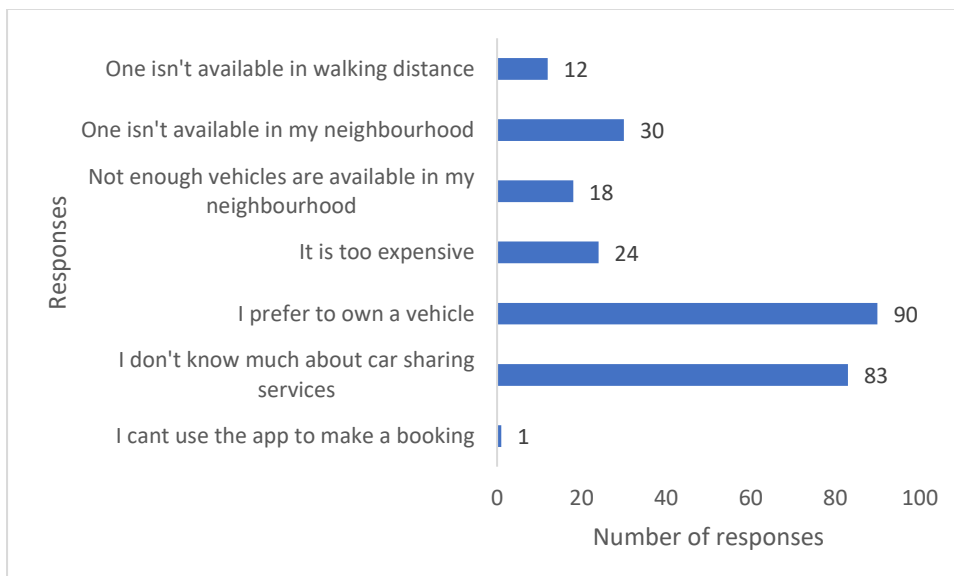
N=262

The future latent demand for car sharing services is also high. 163 respondents 'Agree' that the service is innovative and 61 respondents 'Fully agree' (**Figure 72**).

152 respondents 'Agreed' that car sharing services is a good alternative to owning a car, and 50 respondents 'Fully agree'.

Figure 72

Car sharing services such as GoGet and Flexicar are innovative services
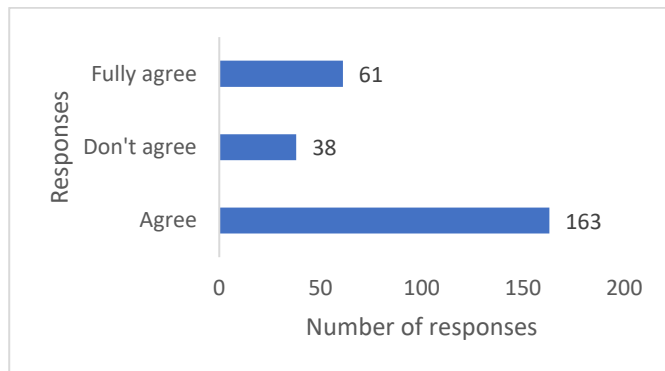
N=262

Figure 73

Car sharing through services such as GoGet and Flexicar is a good alternative to owning a car
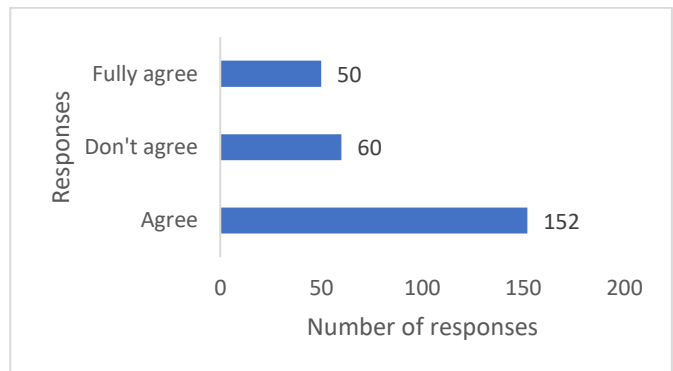
N=262

Survey results of members of car sharing services – Melbourne and Brisbane

A small number of survey participants were members of car sharing services. The responses to the survey questions for members are outlined below.

Which of the following best describes the reason you joined a car sharing service such as GoGet and Flexicar?		
	Melbourne N=7	**Brisbane N=4**
As a back-up, in case my car breaks down	2	
I don't always have access to a car when I need it	3	1
Interested in driving other models of cars	1	1
Other	1	2
If you used a car sharing service such as GoGet or Flexicar in the last 12 months, what was the primary purpose of your last car share reservation?		
Family/personal errands	3	1
Other	1	1
Social/recreational	2	
Work-related	1	1
Shopping		1
If you used a car sharing service such as GoGet or Flexicar in the last 12 months, including yourself, how many passengers were in the vehicle during your car sharing reservation?		
1 passenger	3	2
2 passengers	4	2
If you used a car sharing service such as GoGet or Flexicar in the last 12 months, how did you travel to pick up the car share?		
Private Vehicle (car or truck)	1	
Walk	6	2
Bus		1
Other		1

If car share such as GoGet or Flexicar was not available, would you have made the trip?		
Maybe	3	1
No	2	
Yes	2	3
How would you have made this trip without car share such as GoGet or Flexicar?		
I would have gone to a different location	2	
I would have used a different mode of travel (for example, my own car, bus, train or tram)	5	3
I am unsure		1
What mode of travel would you have used?		
Borrowed a car	1	
Rented a car	1	1
Train	1	
Tram	2	
Driven my own car		2
Taxi, Uber or Didi		1

Discussion of results

The purpose of this research paper is to establish if car sharing services improved transport accessibility, particularly in low socio-economic areas. The focus of the study is the two largest for-profit car sharing services, GoGet and Flexicar in medium to high population density areas.

The findings from the survey in the cities of Melbourne and Brisbane and review of the survey findings in low socio-economic regions in Melbourne characterised by population density that would support a for-profit car sharing service, found that car sharing services do not improve accessibility in low socio-economic areas. This finding is similar to the findings in the majority of the literature on car sharing and accessibility (Dill and MacNeil 2021). Brisbane and Melbourne GoGet and Flexicar car sharing services mostly service high density, medium to high socio-economic suburbs. Interestingly, only 7 respondents in Melbourne, none of whom resided in the low socio-economic areas and 4 respondents in Brisbane of the total of 525 survey respondents were members of car sharing services.

Over fifty per cent of the survey respondents aged 45+ preferred to own a car rather than join a car sharing service in Melbourne. However, around 30 per cent of 18-34 years old who responded to the survey preferred to own a car. In Brisbane, 43 per cent of 45+ years old preferred to own a car, compared to 30 per cent of 18-34 years old.

The survey findings to the question "Assuming a car sharing service such as GoGet or Flexicar is near you place of residence (located up to 400m), would you not own a car and use the car sharing service" were similar for the two cities. Just over 60 per cent of the respondents aged 45+ and 47 per cent of the respondents aged 18 to 34 years old preferred to own a car rather use a car sharing service in Melbourne. In Brisbane 56 per cent of respondents 45+ years old and 48 per cent of respondents 18 to 34 years old preferred to own a car rather use a car sharing service.

A US study by Shaheen et al 2015 suggests that car sharing "succeeds because it either provides consumers with better mobility or sufficient mobility at reduced cost." Within the Australian context Currie and Delbosc (2011) also suggest that the preference for car ownership is linked to the mobility benefits it offers.

However, this does not fully explain why ownership as opposed to access to cars is preferred, especially in low socio-advantaged areas where car ownership is a financial burden. For example, the responses on the potential use of car sharing services as outlined in **Figure 17** and **Figure 68** for Melbourne and Brisbane suggest strong latent demand for car sharing services for trips such as family and social/recreational trips. In Melbourne, most of the new trips that a car sharing service would allow one to make was between social/recreational use (120 responses) and family/personal use (119 responses). However, use for work/school purposes was the next highest (100 responses), followed by medical (74 responses) and shopping (73 responses). In Brisbane, the responses were similar social/recreational (120 responses) and family/personal (111 responses) for new trips if a car sharing service was available within walking distance. That is, survey respondents are aware of the mobility benefits car sharing has the potential to meet.

The preference for car ownership may be due to a lack of understanding of the benefits of car sharing services, including the savings to household budget and the lack of supply of car sharing services, especially within walking distance (400 metres), to make it a reliable alternative to car ownership.

Kehoe J 2020, undertook a study in Dublin on car shedding due to the presence of car sharing. Kehoe found that car sharing services resulted in few users selling or shedding their car. However, users of car sharing services who owned more than one car were slightly more likely to sell their second or third car. Kolleck 2021 undertook a study on the impact of car sharing on car ownership in Germany and found a similar result for car sharing services like GoGet and Flexicar that is, it did not reduce car ownership.

Jain et al 2022 found that in Melbourne, reduction in car ownership usually occurred within the year prior to joining a car sharing service. Another study by Jain et al 2020 found that in Melbourne those that were likely to move to car sharing services were car owners that had low utilisation and realised that the (high) costs of ownership were not justified.

Car sharing services can save a household between US$150 - US$450 a month (Shaheen et al 2015). The cost of car sharing services such as GoGet and Flexicar in Australia comprises of an annual subscription fee between $30 and $49 and an hourly usage fee from $7 per hour depending on the car sharing service. As Shaheen et al notes, the cost of car sharing is a variable cost for households as opposed to car ownership, which is a fixed cost.

The survey results found a lack of knowledge and understanding of car sharing services, especially among the older population 45+ years old even when the vehicle is located within walking distance. In addition, 193 survey respondents in Melbourne and 234 in Brisbane, could not identify car sharing services (either for-profit or peer-to-peer services). The demographics of these survey respondents are set out in **Figure 74** and **Figure 75**.

Figure 74 Melbourne – could not identify car sharing services

Age		Employment status		How they identify themselves		What is the highest level of education?	
18-24 years old	44	A homemaker or sta	12	Female	141	Bachelor degree	59
25-34 years old	65	Other	1	Male	52	Diploma or certifica	52
35-44 years old	28	Retired	19			Post graduate degr	22
45-54 years old	18	Student	14			Year 12	45
55-64 years old	18	Unemployed and looking for work	11			Year 11 or less	14
65+ year	20	Full-time	99				
N 193		Part-time	45			N	192

Note: there was one blank response to question on education status

Figure 75 Brisbane – could not identify car sharing service

Age		Employment status		How they identify themselves		What is the highest level of education?	
18-24 years old	59	A homemaker or stay-at-home parent	12	Female	167	Bachelor degree	59
25-34 years old	63	Other	6	Male	67	Diploma or certificate	68
35-44 years old	25	Retired	38			Post graduate degree	30
45-54 years old	19	Student	19			Year 12	59
55-64 years old	26	Unemployed and looking for work	11			Year 11 or less	18
65+ year	42	Full-time	94				
N=234		Part-time	66			N=234	

Lower income households also spend a higher proportion of the household income on car ownership. A study by Currie and Delbosc (2011) found that lower income households consider car ownership is not forced on them, but thought they had little choice but to own a car and preferred car ownership. These findings were from 2011 when there was little presence of car sharing services. However, Currie et al's 2018 study found that forced ownership of cars among low-income households was a rapidly growing problem in Melbourne, especially in the outer and middle suburbs. In addition, "forced ownership" meant an increase in "transport poverty" that is, such households end up spending more on transport costs (due to car ownership) than what is affordable.

There is evidence to suggest that in the cities of Melbourne and Brisbane, that car sharing services should be expanded to improve transport equity outcomes for socio-disadvantaged communities. The survey results from this research indicate strong latent demand of car sharing services that is not met either because the service is not available or available within walking distance, are considered too expensive (even though car sharing is a cheaper alternative to car ownership, the preferred option) or households do not know much about car sharing services. In addition, future demand for car sharing services appears strong, including as a substitution for private ownership of cars.

A US study by Kodransky et al 2014 indicated that accessibility could be improved through education on the benefits of car sharing and how to access and use the car sharing services.

The study went on to suggest that language and cultural barriers need to be overcome, for example owning a car could be considered a status symbol of wealth among some non-english speaking background communities. These communities have a strong presence in the west, north-west and south-east regions of Melbourne

There are opportunities for policy makers to make better use of car sharing services to improve transport equity and outcomes in the cities of Melbourne and Brisbane.

Policy implications, further research and conclusion

Car sharing services has the potential to improve transport equity outcomes, especially for low income households. One car share has the potential to replace between 4 to 23 cars (Kolleck 2021), which has strong implications for car sharing in Melbourne where forced ownership and transport poverty is increasing. The findings from this survey suggest a lack of knowledge of car sharing services and supply of services, especially within walking distance (400m), were barries to accessibility and usage. This may include a lack of knowledge on the potential savings of car sharing services to households. Further research on this finding is needed for a better understanding.

There is strong latent demand in medium to high density, low socio-economic areas of Melbourne (west, north west and south east areas) where car sharing services is low in supply. The following policy approaches have been adopted in the US (Kodransky et al 2014), and could be adopted in the cities of Melbourne and Brisbane:

- local councils to incentivise car sharing providers to increase supply in low income suburbs, especially where the density supports a for-profit car sharing service.
- to reduce the financial burden in low income areas, local councils subsidised costs
- targeted outreach program or partnering with community groups, including the elderly, to improve the knowledge and education of carsharing services
- Integrate transport planning with car sharing

This research paper raises several questions on car sharing and transport equity to increase the outcomes for low socio-economic groups. Future surveys may include income as a survey question to provide clearer results from low-socio income respondents as opposed to using geographical locations as an indicator. In addition, the number of survey responses from low socio-economic areas were low, future research could focus more on these low socio-economic, medium to high density areas where for-profit car sharing services are currently in low supply.

In addition, peer-to-peer car sharing services may be a genuine competitor to for-profit car sharing services that may assist in relieving the financial burden of car ownership for low income households. This may be an area for future research in car sharing and transport equity.

Overall, there appears to be a potential role for car sharing to improve access to transport and hence transport equity in low socio-economic areas.

References

1. Australia Bureau of Statistics Census 2021

2. Australian Bureau of Statistics population data 2020 & 2019

3. Adli, Saeid Nazari and Chowdhury, Subeh (2021) 'A Critical Review of Social Justice Theories in Public Transit Planning', Sustainability, 13, 4

4. Boarnet, Marlon G. & Giuliano, Genevieve & Hou, Yuting & Shin, Eun Jin, (2017) "First/last mile transit access as an equity planning issue," Transportation Research Part A: Policy and Practice, Elsevier, vol. 103(C), pages 296-310.

5. Clark, Julie and Curl, Angela (2016) "Bicycle and Car Share Schemes as Inclusive Modes of Travel? A Socio-Spatial Analysis in Glasgow", UK, Social Inclusion 2016, Volume 4, Issue 3, 83-99

6. Currie, Graham and Senbergs, Z (2007) "Exploring forced car ownership in metropolitan Melbourne" Australasian Transport Research Forum

7. Currie, G. and Delbosc, A. (2011), "Mobility vs. Affordability as Motivations for Car-Ownership Choice in Urban Fringe, Low-Income Australia", Lucas, K., Blumenberg, E. and Weinberger, R. (Ed.) Auto Motives, Emerald Group Publishing Limited, Bingley, pp. 193-208.

8. Currie, Graham and Delbosc, Alexa (2011) "Exploring the trip chaining behaviour of public transport users in Melbourne", Transport Policy (18) 204-210

9. Currie, Graham, Delbosc, Alexa and Pavkova, Katerina (2018) "Alarming Trends in the Growth of Forced Car Ownership in Melbourne", Australasian Transport Research Forum Proceedings 30 October – 1 November, Darwin, Australia

10. Delbosc, Alexa and Currie, Graham (2011), "Using Lorenz curves to assess public transport equity", Journal of Transport Geography Volume 19, Issue 6, 1252-1259

11. Dill, Jennifer and McNeil, Nathan (2021) Are Shared Vehicles Shared by All? A Review of Equity and Vehicle Sharing, Journal of Planning Literature, Vol. 36(1) 5-30

12. Fan, Y., 2012. The planners' war against spatial mismatch lessons learned and ways forward. J. Plann. Lit. 27 (2), 153–169.

13. Grengs, J (2010), "Job accessibility and the modal mismatch in Detroit", Journal of Transport Geography 18 (1), 42–54.

14. Jain, Taru, Rose, Geoffrey and Johnson, Marilyn, (2022) "Changes in private car ownership associated with car sharing: gauging differences by residential location and car share typology," Transportation, Springer, vol. 49(2), pages 503-527, April.

15. Kehoe, James (2021), "Usage patterns and preference for car sharing: A case study of Dublin Brian Caulfield", Case Studies on Transport Policy Volume 9, Issue 1, March 2021, Pages 253-259.

16. Kim, K (2015), "Can carsharing meet the mobility needs for the low-income neighborhoods? Lessons from carsharing usage patterns in New York City", Transportation Research Part A 77, 249–260

17. Kodransky, Michael and Lewenstein, Gabriel (2014), "Connecting Low-Income People to Opportunity with Shared Mobility", Institute for Transportation and Development Policy, Feb

18. Kolleck, Aaron, (2021), "Does Car-Sharing Reduce Car Ownership? Empirical Evidence from Germany," Sustainability, MDPI, vol. 13(13), pages 1-17, July

19. Lucas, K (2012) Transport and social exclusion: Where are we now? Transport Policy, 20, 105–113

20. Loose, Willi, Mohr, Mario and Nobis, Claudia (2006), "Assessment of the Future Development of Car Sharing in Germany and Related Opportunities", Transport Reviews, Vol. 26, No. 3, 365–382, May

21. Martens, K (2006), 'Basing transport planning on principles of social justice', Berkeley Planning Journal, 19, 1–17

22. Pede, Elena and Staricco, Luca (2021), "Car sharing and socio-spatial justice: an evidence from three cities", Town Planning Review, 92, (4), 479–505.

23. Ricciardi, Anthony Michael, Jianhong (Cecilia) Xia, Currie, Graham (2015) "Exploring public transport equity between separate disadvantaged cohorts: a case study in Perth, Australia", Journal of Transport Geography 43 (2015), 111–122

24. Rodier, Caroline, Harold, Brian and Zhang, Yunwan (2021), "Early Results from an Electric Vehicle Carsharing Service in Rural Disadvantaged Communities in the San Joaquin Valley" Feb, Institute of Transport Studies, University of California

25. Scheurer, Jan, Curtis, Carey and McLeod, Sam (2017),"Spatial accessibility of public transport in Australian cities: Does it relieve or entrench social and economic inequality?, The Journal of Transport and Land Use, Vol. 10 No. 1 pp. 911–930

26. Shaheen, Susan & Sperling, Daniel & Wagner, Conrad. (1998), "Carsharing in Europe and North America: Past, Present, and Future", Transportation Quarterly, Vol 52

27. Shaheen, Susan, Nelson Chan, Apaar Bansal, and Adam Cohen. 2015. "Definitions, Industry Developments, and Early Understanding." Berkeley, CA: University of California Berkeley Transportation Sustainability Research Center.

28. Taylor, B.D., Ong, P.M. (1995) Spatial mismatch or automobile mismatch? An examination of race, residence and commuting in US metropolitan areas. Urban Stud. 32 (9), 1453–1473.

29. Yang, Katie and Pojani, Dorina (2017), "A Decade of Transit Oriented Development Policies in Brisbane, Australia: Development and Land-Use Impacts", Urban Policy and Research, 35:3, 347-362,