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Australian public perceptions of fully automated vehicles

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Abstract

Automated vehicles (AVs) are often promoted as transformative for transportation, with potential benefits such as enhanced safety, improved accessibility, reduced congestion, and decreased emissions. However, the acceptance of fully automated vehicles in Australia remains under-researched. This study aims to address this gap by exploring Australian public opinion on AVs through a comprehensive survey. Specifically, it assesses seven key factors: perceived benefits/usefulness, ease of use, general attitudes, data privacy concerns, willingness to pay a premium, social influence, and trust in AV technology.

This preliminary study, while limited to descriptive analysis, provides valuable insights into Australian perceptions of AVs. Data collected from 809 Australian participants indicate a generally positive attitude towards AVs, though there is significant reluctance to pay more for fully automated vehicles compared to conventional ones. Concerns about data privacy also emerged as critical issues. These findings reflect current opinions, which can fluctuate significantly over time due to evolving public awareness and media coverage.

The study acknowledges its limitations and recommends future research to consider a longitudinal survey to capture changing public opinions over time. Additionally, the findings are contextualized by comparing them with international studies. For example, Australian participants showed high agreement with the benefits and usefulness of AVs, aligning with earlier research but indicating a slight decline in perceived benefits over time. Ease of use was rated higher in Australia compared to China, potentially due to demographic differences. Attitudes toward AVs were less favorable, reflecting concerns about legal liability and safety, similar to findings in other countries. Data privacy and cybersecurity remained major concerns, consistent with studies from the Netherlands and Singapore.

While the recommendation to enhance public awareness through targeted campaigns is noted, it is crucial to go beyond this. Future investigations should explore the impact of diverse socio-demographic factors and consider behaviour-changing influences. Policymakers should emphasize safety, security measures, and robust cybersecurity protocols in their communications to build public trust in AV technology.

1 Introduction

AVs are expected to arrive in the coming years, bringing many benefits such as increased safety, reduced fuel consumption and decreased traffic congestion. Governments, private companies and the public need to prepare for the deployment of this disruptive technology and assess its potential influence on society. One crucial aspect to consider is public opinion on AVs, including attitudes, willingness to pay and ease of use (Chen et al., 2022). Moreover, it is crucial to investigate the association between demographic and travel behaviour factors

and public opinion on AVs. This can help identify the root causes of opinions on AVs and provide policymakers with targeted strategies to promote AVs' acceptability.

Although previous studies have explored psychological factors such as the usefulness and ease of use of AVs, most studies were conducted in the USA and Europe, and few have been conducted on the Australian population. Moreover, public opinions on and adoption of AVs may vary by country due to differences in travel behaviour and infrastructure network conditions. Therefore, there is a need for further research into the public's ideas about AVs on a country-by-country basis, such as in Australia, which has experienced an unprecedented infrastructure boom since 2017.

Several studies have investigated factors influencing individual concern about AVs, including social, economic, ethical and legal issues, psychological responses to AVs and automated driving systems and the effect of non-chronological age factors on AV acceptance. Other studies have examined the influences of facilitating conditions, social influence, usefulness and demographic variables such as age, marital status and educational background on intention to use AVs. Some studies have highlighted the importance of travel behaviour characteristics, such as travel needs and affordability, in AV acceptance.

Therefore, this study systematically explored the factors affecting public opinion on fully AVs in Australia. Specifically, the study examined seven key attributes of the acceptability of AVs and their association with demographic characteristics and travel behaviour. The findings of this study can provide insights into how to improve AV acceptability in Australia and potentially other countries facing similar challenges.

2 Survey analysis

2.1 Survey design

The survey constructs mainly originated from previous scientific literature surveys investigating the public perception of AVs. Therefore, the survey items were formulated and then distributed to Australian participants. The survey included 54 five-scale Likert questions, socio-demographic questions (e.g., age, income, household size and travel habits) and transport policy-related questions (please see the appendix). These five-scale Likert questions (1 being 'strongly agree' and 5 being 'strongly disagree') were categorised into seven groups to assess public opinions on AVs:

1) Usefulness and benefits—18 statements relating to 'potential usefulness and benefits' of fully AVs (e.g., 'I would find automated cars advantageous').
2) Ease of use—11 statements relating to 'ease of use' of fully AVs (e.g., 'Test-ride events for automated cars are beneficial for me to buy or use automated cars').
3) Attitude—12 statements relating to 'attitude towards using' fully AVs (e.g., 'When I see automated cars on the roads, I would intend to adopt them').
4) Data privacy—three statements relating to 'data privacy' regarding fully AVs (e.g., 'Automated cars would not collect too much information about your personal data').
5) Willingness to pay—two statements relating to 'willingness to pay' for fully AVs (e.g., 'I am willing to pay more for automated cars if I want to purchase them').

In addition to these two statements, participants were asked, 'How much value do you think automated cars are worth compared to conventional cars?' There were five choices from which participants could choose:

- less than 10 per cent
- 10 to 20 per cent less
- same as conventional car to 10 per cent more than conventional car

- 10 to 20 per cent more than conventional car
- >20 per cent more than conventional car.

6) Word of mouth—four statements relating to ‘word of mouth’ regarding fully AVs (e.g., ‘I will easily be influenced by others for the opinion of automated cars’).
7) Trust—four statements relating to ‘trust’ regarding fully AVs (e.g., ‘Automated cars are dependable’).

2.1.1 Data analysis procedure

The statistical analysis was based on descriptive analysis. Firstly, descriptive statistics of the survey items were undertaken (e.g., means, medians, standard deviations and frequencies). Secondly, transport policy-related questions were analysed to identify the public AVs behaviour.

2.2 Results

2.2.1 Descriptive analysis for survey items

Labels and statistics for each survey item are presented in Table 1. This section will provide the overall findings of each of the seven groups. Given the relatively large sample size (809 respondents), the differences between each survey item were statistically significant ($p < 0.01$). For instance, the difference in mean response for benefits (congestion) and benefits (traffic quality) was statistically significant, although the concept of these two survey items is similar. Therefore, the p values were not reported because all differences between variables were statistically significant (see Table 1). Further, the Kolmogorov–Smirnov test showed that survey items were not normally distributed, which further justified the use of non-parametric tests (i.e., Spearman rho correlations).

Based on Figure 1, which plots all the surveyed items in a stacked figure, the response to "trust (dependable)" is mostly neutral, as the question is more generic. Conversely, the item with the highest number of "somewhat agree" and "strongly agree" responses is "ease of use (test-ride)," followed by "ease of use (education)." This trend is consistent among those who selected "strongly agree," with "ease of use (test-ride)" leading, followed by "ease of use (education)." This indicates that Australians believe test ride events and education about AVs could significantly benefit their adoption and should be considered in policy campaigns.

Interestingly, the item with the greatest number of people who chose "strongly disagree" or “somewhat disagree” is "willingness to pay," indicating that Australians are generally unwilling to pay more for AVs. Similarly, the highest combined number of "strongly disagree" and "somewhat disagree" responses is seen in "willingness to pay (car-pooling)." This suggests that not only are Australians reluctant to pay extra for AVs, but they are also not inclined to participate in car-pooling, given the prevalent car usage in Australia.

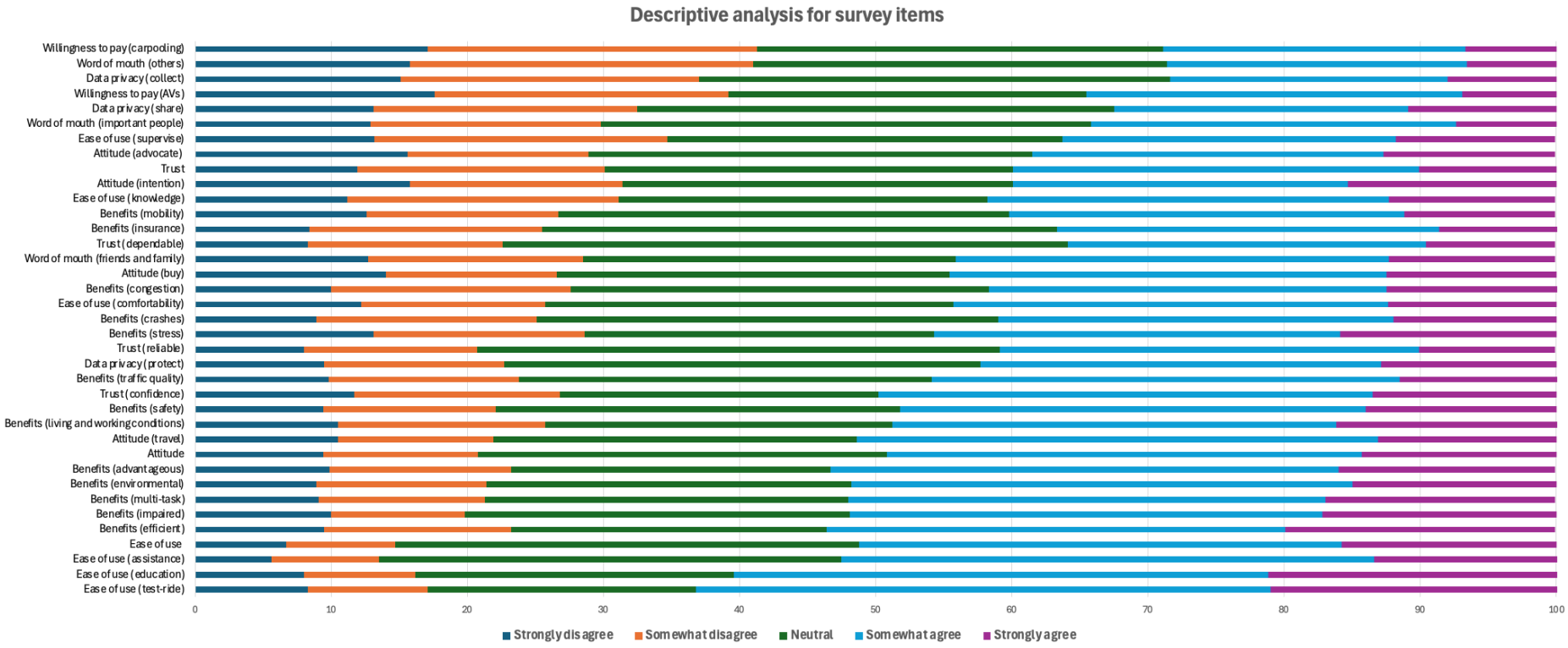
Table 1: Descriptive statistics for each survey item

Survey item	Variable	Distribution of frequency (% of sample)					Mean (standard deviation)
Benefits and usefulness							
I) I would find automated cars advantageous.	Benefits (advantageous)	9.9	13.3	23.5	37.3	15.9	3.36 (1.188)
II) Using automated cars can make my daily life and work more efficient.	Benefits (efficient)	9.5	13.7	23.2	33.7	19.8	3.41 (1.218)
III) The use of automated cars is beneficial to improving both my living and working conditions.	Benefits (living and working conditions)	10.5	25.2	25.5	32.6	16.7	3.30 (1.213)
IV) Increasing usage of automated cars will cause less traffic congestion.	Benefits (congestion)	10.0	17.6	30.7	29.2	12.6	3.17 (1.160)
V) I believe that the use of automated cars can improve traffic quality.	Benefits (traffic quality)	9.8	14.0	30.3	34.4	11.6	3.24 (1.132)
VI) I would find fewer crashes when using automated cars.	Benefits (crashes)	8.9	16.2	33.9	29.0	12.0	3.19 (1.120)
VII) I would find lower insurance rates for automated cars compared to conventional cars.	Benefits (insurance)	8.4	17.1	37.8	28.1	8.7	3.11 (1.059)
VIII) Using automated cars will be useful in meeting my mobility need.	Benefits (mobility)	12.6	14.1	33.1	29.0	11.1	3.12 (1.170)
IX) I find automated cars to be useful when I'm impaired (e.g., drowsy).	Benefits (impaired)	10.0	9.8	28.3	34.7	17.2	3.39 (1.175)
X) Fully automated cars will let me do other tasks, such as eating on my trip.	Benefits (multi-task)	9.1	12.2	26.7	35.0	16.9	3.38 (1.171)
XI) I believe that the use of automated cars can improve environmental quality.	Benefits (environmental)	8.9	12.5	26.8	36.8	15.0	3.36 (1.147)
XII) I believe that the use of automated cars can improve traffic safety.	Benefits (safety)	9.4	12.7	29.7	34.2	14.0	3.31 (1.145)
XIII) Using automated cars will relieve my stress of driving.	Benefits (stress)	13.1	15.5	25.7	29.8	15.9	3.20 (1.255)
Ease of use							
I) Education on automated cars would be beneficial to me.	Ease of use (education)	8.0	8.2	23.4	39.2	21.3	3.57 (1.147)
II) Test-ride events for automated cars are beneficial for me to buy or use automated cars.	Ease of use (test-ride)	8.3	8.8	19.7	42.2	21.1	3.59 (1.157)
III) I will find automated cars easy to use.	Ease of use	6.7	8.0	34.1	35.4	15.8	3.46 (1.062)
IV) I would have the knowledge necessary to use an automated car.	Ease of use (knowledge)	11.2	19.9	27.1	29.5	12.2	3.12 (1.193)
V) I would know how to supervise an automated car.	Ease of use (supervise)	13.2	21.5	29.0	24.5	11.7	3.00 (1.208)
VI) I would find the technical assistance for automated cars to be available from specific individuals or groups.	Ease of use (assistance)	5.6	7.9	34.0	39.1	13.5	3.46 (1.006)
VII) I can comfortably use automated cars for my daily trips.	Ease of use (comfortability)	12.2	13.5	30.0	31.9	12.4	3.19 (1.185)

Survey item	Variable	Distribution of frequency (% of sample)					Mean (standard deviation)
Attitude							
I) I intend to use the automated car.	Attitude (intention)	15.8	15.6	28.7	24.6	15.3	3.08 (1.282)
II) I will advocate automated cars to others.	Attitude (advocate)	15.6	13.3	32.6	25.8	12.6	3.07 (1.232)
III) In the future, I would buy automated cars.	Attitude (buy)	14.0	12.6	28.8	32.1	12.5	3.17 (1.217)
IV) I would travel in automated cars with other passengers as well.	Attitude (travel)	10.5	11.4	26.7	38.3	13.1	3.32 (1.157)
V) Using automated cars is a good idea.	Attitude	9.4	11.4	30.0	34.9	14.3	3.33 (1.141)
Data privacy							
I) Automated cars would not collect too much information about your personal data.	Data privacy (collect)	15.1	21.9	34.6	20.4	8.0	2.84 (1.151)
II) Automated cars would not share your information with other parties without your permission.	Data privacy (share)	13.1	19.4	35.0	21.6	10.9	2.98 (1.171)
III) Automated cars would have strong security measures to protect your personal information.	Data privacy (protect)	9.5	13.2	35.0	29.4	12.9	3.23 (1.127)
Willingness to pay more							
I) I am willing to pay more for automated cars when I do carpooling with automated cars.	Willingness to pay (carpooling)	17.1	24.2	29.8	22.2	6.7	2.77 (1.168)
II) I am willing to pay more for automated cars if I want to purchase them.	Willingness to pay (AVs)	17.6	21.6	26.3	27.6	6.9	2.85 (1.204)
Word of mouth							
I) I will easily be influenced by others for the opinion of automated cars.	Word of mouth (others)	15.8	25.2	30.4	22.0	6.6	2.78 (1.150)
II) People whose opinions are important to me would like automated cars too.	Word of mouth (important people)	12.9	16.9	36.0	26.8	7.4	2.99 (1.118)
III) I think I am more likely to use the automated cars if my friends or family used it.	Word of mouth (friends and family)	12.7	15.8	27.4	31.8	12.2	3.15 (1.206)
Trust							
I) Automated cars are dependable.	Trust (dependable)	8.3	14.3	41.5	26.3	9.5	3.14 (1.048)
II) Automated cars are reliable.	Trust (reliable)	8.0	12.7	38.4	30.8	10.0	3.22 (1.054)
III) Overall, I can trust automated cars.	Trust	11.9	18.2	30.0	29.8	10.1	3.08 (1.164)
IV) I feel confident that I could use an automated car.	Trust (confidence)	11.7	15.1	23.4	36.3	13.5	3.25 (1.210)

Notes. Likert scale for survey items ranges from 1 (strongly disagree) to 5 (strongly agree) with intermediate options of 2 (somewhat disagree), 3 (neither agree nor disagree) and 4 (somewhat agree)

Figure 1: Descriptive analysis for surveyed items



Usefulness and benefits. Generally, participants demonstrated positive attitudes towards every aspect of benefits and usefulness. The most positive aspect was benefits (efficient) (M = 3.41, Std Dev. = 1.218), followed by benefits (impaired) (M = 3.39, Std Dev. = 1.175) and benefits (multi-task) (M = 3.38, Std Dev. = 1.171). The finding aligns with Cunningham, Regan, Horberry, Weeratunga and Dixit (2019), who demonstrated the same high level of agreement in terms of benefits (impaired). Conversely, the least positive aspects were benefits (insurance) (M = 3.11, Std Dev. = 1.059) and benefits (mobility) (M = 3.12, Std Dev. = 1.170). This is in agreement with the findings of Kester (2022), indicating that insurers should respond to the challenges due to liability shifts from the driver to the driving system and the future of shared mobility. These challenges may cause insurance-related concerns. There is no surprise that benefits (efficient) was ranked the highest average score because Fakhrmoosavi et al.'s (2020) research demonstrated that AVs could contribute to traffic flow efficiency, thereby increasing road capacity and decreasing energy consumption.

Ease of use. From a high level, participants tended to demonstrate a more optimistic attitude towards any variables associated with ease of use than other groups from the questionnaire. For example, the most strongly agreed survey item was ease of use (test-ride) (M = 3.59, Std Dev. = 1.157), while the least strongly agreed item was ease of use (supervise) (M = 3.00, Std Dev. = 1.208). Therefore, participants believed that test-ride events would help them to buy or use AVs because they tended not to know how to supervise an AV. Similarly, ease of use (test-ride) and ease of use (education) (M = 3.57, Std Dev. = 1.147) ranked the second most strongly agreed item. Australian participants generally believed AVs would be easy to use but need more training, knowledge and assistance to facilitate AV use.

Attitude. Although participants generally had lower scores for attitude compared with the usefulness, benefits and ease of use groups, they still had relatively positive attitudes towards using AVs (above neutral). The two highest scores in this group were for attitude (M = 3.33, Std Dev. = 1.141) and attitude (travel) (M = 3.32, Std Dev. = 1.157). Given the AVs' benefits of easing traffic congestion (Fakhrmoosavi et al., 2020), AVs potentially positively influence attitudes because traffic congestion influences comfort levels (Delmas, Camps & Lemercier, 2022). In contrast, the lowest score in the attitude group was attitude (advocate) (M = 3.07, Std Dev. = 1.232). This finding is similar to the finding from the 'ease of use' group because participants intended to learn how to use AVs but were less willing to advocate for AVs before knowing how to use them.

Data privacy. Compared with other groups, participants were most concerned about data privacy, particularly data privacy (collect) (M = 2.84, Std Dev. = 1.151), followed by data privacy (share) (M = 2.98, Std Dev. = 1.1.71). Interestingly, although participants tended to believe AVs would have strong security measures (data privacy [protect]: M = 3.23, Std Dev. = 1.127) to protect their personal information, they were still concerned AVs would collect and share personal information without consent.

Willingness to pay more. Participants tended to disagree with paying more for AVs (willingness to pay [carpooling]: M = 2.77, Std Dev. = 1.168; willingness to pay [AVs]: M = 2.85, Std Dev. = 1.204) compared with owning vehicles, consistent with a similar outcome in a US study (Harb et al., 2021). However, most participants (27.8 per cent) chose the option 'same as conventional car to 10 per cent more than conventional car', followed by '10 per cent to 20 per cent more than conventional car'" (25.7 per cent) and '>20 per cent more than conventional car' (20.9 per cent). This finding contradicts with survey items from the willingness to pay more group. Therefore, it is worthwhile investigating this further in different scenarios.

Word of mouth. Word of mouth did not play an important role in adopting AVs, with most people holding neutral ideas. Among others, people who were important to participants and friends and family played a relatively important role in influencing participants' decisions (word of mouth [friends and family]: M = 3.15, Std Dev. = 1.206).

Trust. Similar to the benefits/usefulness, ease of use and attitude groups, respondents demonstrated a relatively high level of agreement. The highest level of agreement was for trust (confidence) (M = 3.25, Std Dev. = 1.210), followed by trust (reliable) (M = 3.22, Std Dev. = 1.054).

2.2.2 Descriptive analysis for transport policy related questions

Figure 2 shows the major reasons why participants would buy AVs with three levels of importance. Improved safety was the most important reason, followed by better fuel savings and decreased travel time. Additionally, other reasons such as being user-friendly, better access for those with disabilities, being environmentally friendly, avoiding car parking issues and prompt response to congestion problems played minor roles in buying AVs. The test of new technology (e.g., automation technology) played the least important role in purchasing AVs.

Figure 2: Reasons for purchasing automated vehicles

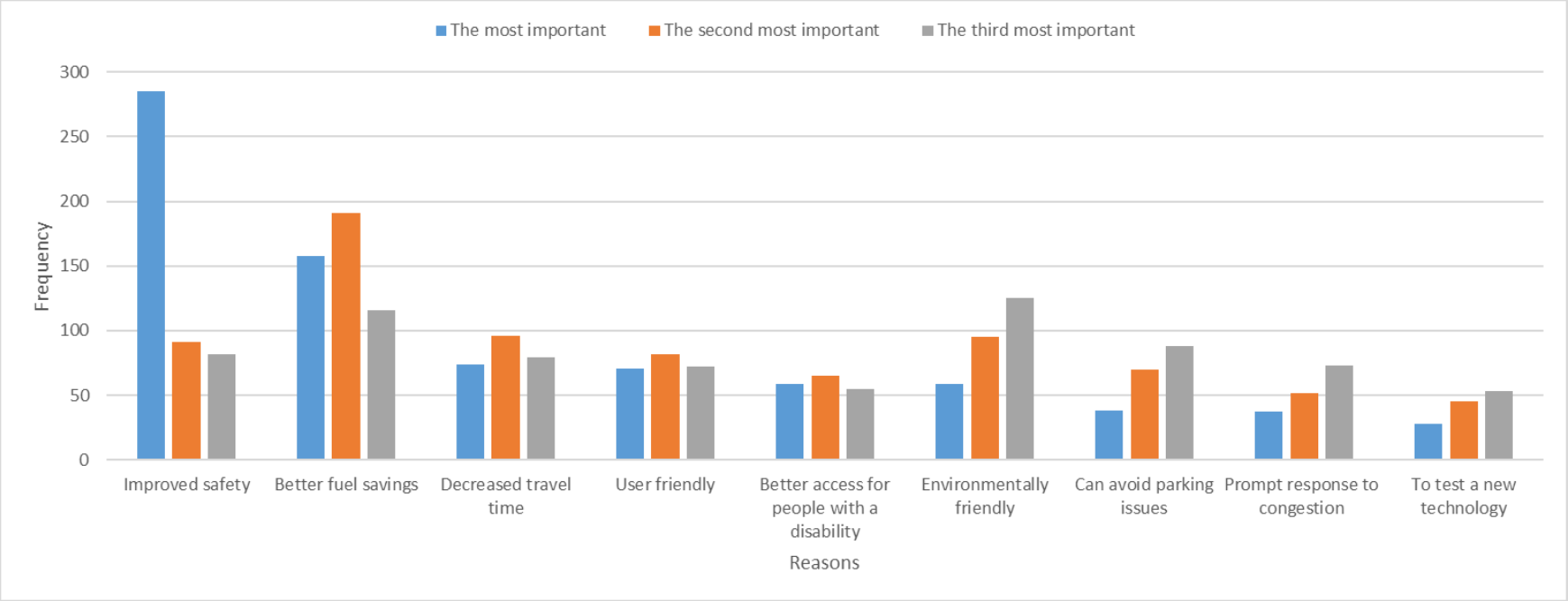
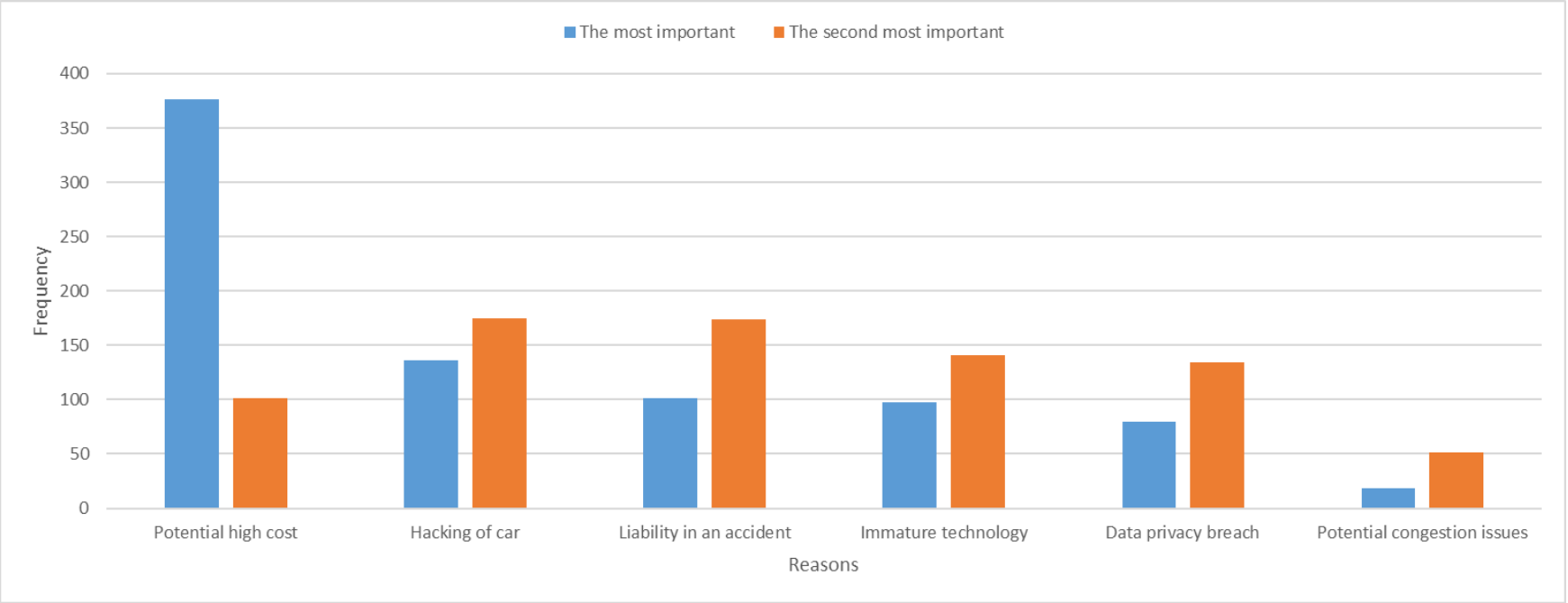


Figure 3 demonstrates the major reasons preventing the public from buying AVs with two levels of importance. The most important reason preventing participants from purchasing AVs was the potentially high cost. In contrast, other reasons played relatively more minor roles (e.g.,

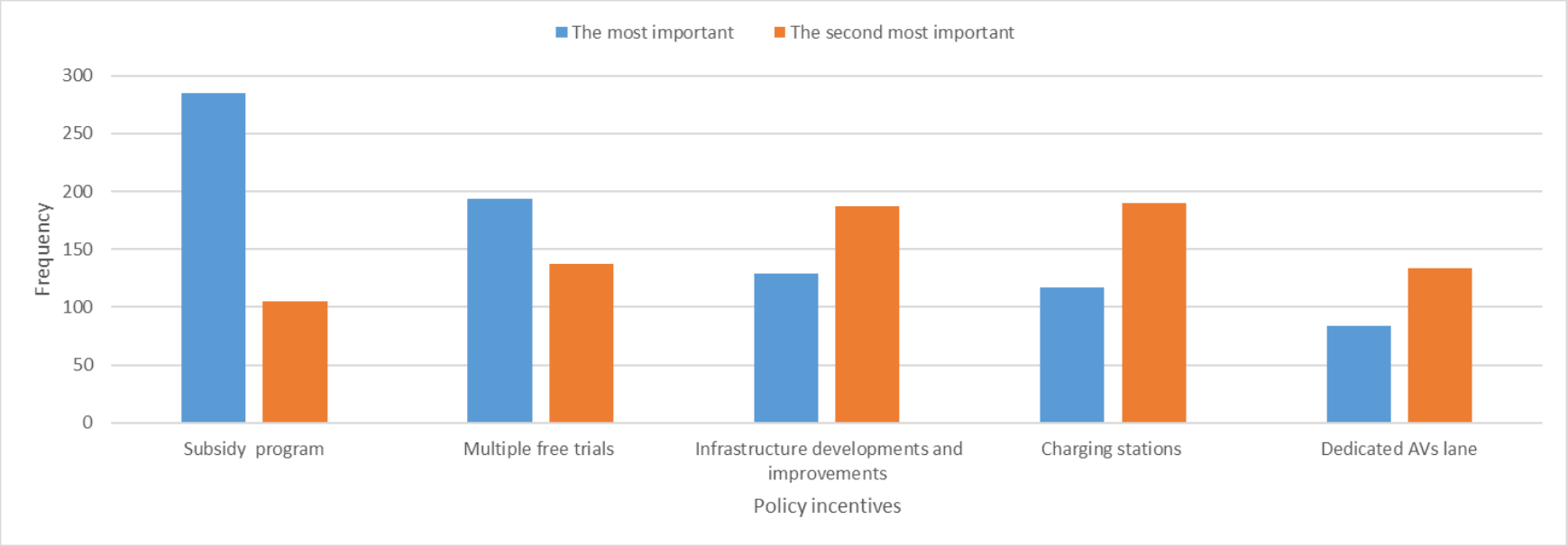
hacking of car, liability for accident, immature technology, data privacy and congestion issues). This suggests that the Australian public could be sensitive to the price.

Figure 3: Reasons for not purchasing automated vehicles



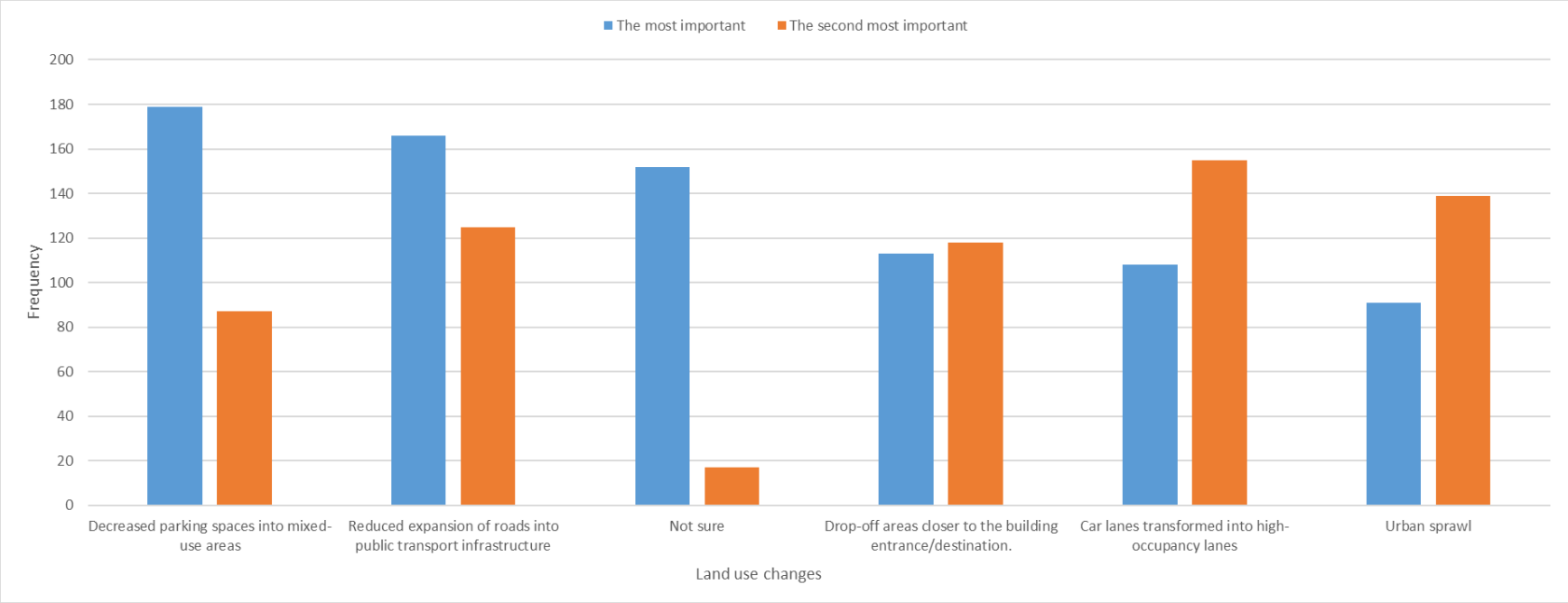
As shown in Figure 4, a subsidy program was the policy that would most incentivise participants to purchase AVs. This aligns with Figure 2, which shows that the potentially high cost of AVs was the most important reason preventing participants from buying AVs. In addition, multiple free trials run by the government to understand and experience AVs were the second most important reasons, followed by infrastructure developments and improvements. Dedicated AV lanes (i.e., travel time saving) was the least important reason.

Figure 4: Policy incentives to encourage purchasing automated vehicles



According to Figure 5, for participants, the most critical land use change was decreased parking spaces to make way for pedestrian-friendly and mixed-use areas, followed by reduced expansion of roads into walking, bicycling and PT infrastructure. Participants were significantly affected by car-related spaces but were not concerned about urban sprawl, as AVs could help people reach their destinations with less travel time and more entertaining activities. This may appear beneficial for consumers, but it raises concerns for transport planners if it results in replacing parking with automated vehicles traveling greater distances or continuously circulating while waiting for someone to complete a task. Transport management policies such as converting car lanes into high-occupancy lanes (e.g., cars with more than two people) were less critical to participants. It is not surprisingly to see that the number of people who choose charging stations as AVs link with electric vehicles (e.g., Telsa). Hence, saving fuel costs as part of AVs benefits could be contributed by using electric vehicles or smoothing traffic flow by AVs.

Figure 5: Land use changes that would have critical effects



3 Discussion

Recent research has discussed the details of public opinions on AVs in Australia with the rapid transition from CVs to self-driving vehicles. The dependent variables, independent variables (e.g., socio-demographic) and their relationship are discussed below.

Australian participants tended to have a high level of agreement with benefits and usefulness after being briefed on fully AVs, especially with the benefits of making daily life and work more efficient. The outcome of this study aligns with a similar study (Cunningham et al., 2019), which collected data in 2017, suggesting that Australians hold similar views on usefulness and benefits as before. However, the level of agreement with benefits (impaired) reduced from 3.94 (mean rating) to 3.39 (mean rating) in this study. Additionally, further research could investigate contradicting benefits at a system level, such as arriving at a destination safely but quickly (Edelmann, Stumper & Petzoldt, 2023).

3.1 Ease of use

Australian participants showed a higher level of agreement for ease of use than for usefulness and benefits. However, they were not confident they had enough knowledge to use or supervise AVs. Xu et al. (2021) conducted a similar study by collecting data from university students in China. The study showed that the average ease of use score was around 3.8 compared with 3.5 in this study, which could be because younger age groups tend to treat AVs more positively.

3.2 Attitude

Although participants showed relatively higher agreement for usefulness, benefits and ease of use, their attitude towards using AVs showed lower levels of agreement. This observation could be because Australians still show concerns, such as legal liability, safety, security and data privacy issues (Cunningham et al., 2019). Specifically, individuals with driver's licences were more concerned with their reaction to the driving environment, legal liability and performance in bad weather conditions (Kim et al., 2022). Another recent study found that enhancing the built environment (e.g., neighbourhood walkability) was an effective way to increase interest in using AV riding and sharing services (Wali & Khattak, 2022).

3.3 Data privacy

Consistent with the findings of (Ljubi and Groznik, 2023) (Chen et al., 2023) (Chen, 2023), data privacy and cybersecurity were the two survey items of most concern to the study participants, especially the statement that automated cars would not collect too much information about your personal data'. These two concerns have remained at the same low agreement level since 2017 (Cunningham et al., 2019). Previous research also found that individuals were primarily concerned with software hacking and data transmitting issues, although the research was conducted in the Netherlands nearly 10 years ago (Kyriakidis & de Winter, 2015). AVs are more vulnerable in terms of data privacy and cyber attacks than CVs; therefore, addressing these risks requires awareness campaigns, educational training and stringent government regulation. In Singapore, a high-density area, Tan and Taeihagh (2021) found that privacy, cybersecurity, liability and safety were still major technological risks in the current AV industry.

3.4 Willingness to pay

In this study, Australian participants were less likely to agree with 'pay more for AVs'. A range of reasons could cause this. For example, the outcome of this study aligns with the findings of Cunningham et al. (2019), who demonstrated that Australian individuals are unlikely to pay more for AVs than the same car without automation. Weigl, Eisele and Riener (2022) also reached a similar conclusion, indicating that around 33 per cent of males and females would

not pay more for a fully AV. In this research, participants indicated that they would pay, on average, 14.5 per cent more for a fully AV. Using a binary question to ask respondents whether they wanted to purchase the described AVs, Shabanpour et al. (2018) revealed that individuals more sensitive to purchase prices and policies that could take liability away from accidents compared to other factors, such as fuel efficiency, environmental benefits and safety.

3.5 Word of mouth

Australian participants tended not to be influenced by others' ideas except by friends and family. However, this may have negative effects on using AVs because individuals willing to recommend services were not from the same groups intending to use future AV services (Guo et al., 2022). Although Guo et al.'s (2022) involved automated buses, similar experiences could be drawn from this study. Additionally, the influence of word of mouth (mass media) is achieved through self-perception because word of mouth greatly affects self-perception, particularly on subjective norms and self-efficacy (Du, Zhu & Zheng, 2021).

4 Summary

This study gauged the Australian public's opinion on fully AVs in Australia regarding seven important items: benefits and usefulness, ease of use, attitude, data privacy, willingness to pay more, word of mouth and trust. Although Australian participants tended to have a higher level of agreement on most items, opinions varied among different items, such as data privacy and ease of use. To tackle the areas of concern (i.e., data privacy), manufacturers should prioritise introducing compulsory data security features during the vehicle design process, such as transfer layer solutions and physical layer security solutions. In terms of willingness to pay, early exposure to technology (e.g., automation) by holding regular technology awareness sessions for the public could affect it positively.

CAVs are expected to play a significant role in shaping the future of transportation. However, public acceptance of CAVs is critical for their successful adoption, and trust in CAV technology is a key factor influencing individuals' attitudes towards them. As CAVs rely heavily on communication technology and connectivity, concerns over data privacy and security can undermine trust in CAVs. Therefore, it is crucial to investigate the relationship between trust in CAV technology and perceived data privacy and security.

This study has several limitations that need consideration in future research. Future investigations should explore the impact of diverse socio-demographic factors, such as age, gender, and educational qualifications, on the adoption of AV through correlational analysis. Therefore, this study raises another socio-demographic question: why do younger age groups tend to view AVs more positively compared to other studies? Although Chen et al. (2024) discloses the socio-demographic factors behind these attitudes, further investigation is needed. The issues of land use changes raised by AVs also have significant impacts, and future studies should be conducted to explore these positive or negative changes. Additionally, employing structural equation modelling, including frameworks like the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), could provide deeper insights into how various attributes, such as perceived ease of use and perceived usefulness, influence adoption rates. Moreover, examining the moderating effects of socio-demographic factors would offer a comprehensive understanding of the factors that affect technology adoption. Also, as the technology evolves, public perceptions may change. A longitudinal survey study is therefore recommended.

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6 Appendix: Questionnaire (transport policy related question)

Please select your preference for the following questions:

1. What is the major reason that would make you buy or use an automated car (can choose up to three answers)?
    - Improved safety
    - Decreased travel time
    - User friendly
    - Better fuel savings
    - Better access for people with a disability
    - To test a new technology
    - Environmentally friendly
    - Can avoid parking issues
    - Prompt response to congestion (could react and reroute easily when congestion occurs)

2. Which factor would be the most critical reason that prevents you from using an automated car (can choose up to two answers)?
    - Potential high cost
    - Data privacy breach
    - Hacking of car
    - Immature technology
    - Potential congestion issues
    - Liability in accident

3. Which policy would be the biggest incentive for you to buy or use an automated car (can choose up to two answers)?
    - Subsidy to automated car program
    - Multiple free trials (run by the government and the manufacturer) of using automated car to better understand the driving experience and technological benefits
    - Automated car-related infrastructure developments and improvements, such as sensors, street signs that send the signal to automated car
    - More charging stations for electrically powered automated car
    - Convert some normal lanes into the lane that only automated cars can use

4. With the following potential land-use changes brought by automated cars, which changes would have the most critical impact on you (can choose up to two questions)?

- Decreased parking spaces that are converted into pedestrian-friendly and mixed-use areas
- Reduce the expansion of roads and convert them into walking, bicycling and public transport infrastructure.
- Drop-off areas will be closer to the building entrance/destination.
- Car lane will be transformed into a high-occupancy lane (cars with more than one person are allowed to travel) to encourage car-pooling
- People can live further away from the city due to reduction in travel time to their workplace
- Not sure