

Consumer preferences for Mobility-as-a-Service (MaaS) in Australia¹

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Abstract

This study surveyed 3,985 geographically and demographically representative Australians nationwide, to understand consumer demand and willingness to pay for Mobility-as-a-service (MaaS) in Australia. Our analysis confirms that there is definitely a market for MaaS in Australia. For example, we find that 32 per cent of the Australian population would adopt a MaaS scheme that offers pay-as-you-go access to local public transport, long distance public transport and taxi services for a monthly charge of \$5 if such a service were available in the market today. On average, consumers prefer pay-as-you-go schemes to schemes that offer unlimited access to one or more transport modes and services at fixed monthly costs. Local public transport, taxis and long-distance public transport are the most popular transport services. Willingness to use MaaS is strongly correlated with age and lifecycle stage: young individuals who are employed full-time are most likely to use MaaS; older adults who have retired from the workforce and whose children have left home are least likely to use MaaS.

1. Introduction

Recent advances in transport technologies and services have resulted in the development of the concept of Mobility as a Service (MaaS), where consumers can purchase access to multiple transport modes and services, owned and operated by different mobility service providers, through a single integrated digital platform for planning, booking and payment (Kamargianni et al., 2016; Sochor et al., 2016; Heikkilä, 2014; Hietanen, 2014).

The objectives of this paper are two-fold: (1) to explore Australian consumer preferences in relation to MaaS; and (2) to support the development of suitable MaaS systems for the Australian community. To understand consumer preferences and expectations for MaaS, we surveyed 3,985 demographically and geographically representative Australians nationwide. Survey participants were asked about their current travel behaviour; attitudes towards different modes of transport; and preferences for different MaaS systems. This study reports some of the key findings that emerged from the survey.

The remainder of the paper is structured as follows. Section 2 describes the data collected by this study. Section 3 presents estimation results from a discrete choice model of stated MaaS

¹ This is an abridged version of the paper originally presented at ATRF 2018. For further information about this research please contact the authors

purchase behaviour. Section 4 concludes with a discussion of key findings and directions for future research.

2. Data

We recruited 3,985 Australians nationwide March 2018 through an online consumer panel to give their responses to a web-based survey. By and large, our sample is roughly representative of the national population. Any differences between the sample population and the national population have been controlled for in our analysis through appropriate reweighting procedures. The consumer survey comprised five sections:

1. Current travel behaviour: Respondents were asked about their car and motorcycle ownership; frequency of use of different transport modes; dependence on mobility devices; and household monthly travel expenditure.

2. Preferences for on-demand transport (ODT) services: Respondents were asked about their awareness of and familiarity with ODT. Each respondent was presented four different scenarios with hypothetical ODT services. Respondents were asked to imagine that they have access to the hypothetical ODT service described in the scenario, and asked to indicate how frequently they would use such a service, and for what kinds of trips. We exclude findings from this section of the survey, as it is not directly related to MaaS and not relevant to the present study's objectives.

3. Preferences for MaaS schemes: Respondents were asked about their awareness of and familiarity with MaaS. Each respondent was presented four different scenarios, such as the one shown in Figure 1. For each scenario, respondents were presented two hypothetical MaaS schemes that differ from each other in terms of the transport services that they offer access to, level of ticketing and booking integration, degree of personalization, availability of real-time information, subscription model, and price. The attributes were varied systematically across scenarios and respondents.

4. Attitudes: Respondents were asked to state their level of agreement or disagreement with statements measuring their attitudes towards driving, car ownership, public transport, carsharing, ODT, MaaS, and new technologies and services in general.

5. Demographics: Respondents were asked about their age, gender, education, employment, place of residence, household size and structure, and income.

The survey concluded with an open text question to elicit any feedback from respondents about the survey itself. Respondent feedback was largely positive, and specific comments indicated a high level of engagement.

Figure 1: Example screenshot of hypothetical scenario to elicit consumer preferences for different MaaS schemes

Scenario 1 of 4

Imagine that the following Mobility-as-a-Service (MaaS) schemes are available in your state. For each transport service type, imagine that the schemes offer equal access to all operators in your state that provide that service type. For example, a scheme that offers access to car rental services offers access to ALL car rental companies operating in your state.

		Scheme A	Scheme B
Transport Services	Local public transport (buses, trams, local trains, ferries, etc.)	✗	✓
	Long distance buses and trains	✓	✓
	Taxis	✗	✗
	Car rental (e.g. Hertz, Thrifty)	✓	✗
	Carshare (e.g. GoGet)	✗	✗
	Rideshare (e.g. UberX)	✓	✗
	Bikeshare (e.g. Reddygo, Melbourne Bike Share, City Cycles)	✗	✓
Real-time information (e.g. service interruptions, schedule delays)	Available	Available	
Personalization (e.g. save preferred services, show wheelchair friendly routes)	Available	Available	
Ticketing integration (i.e. can the same card or device be used for all transport services in the Scheme?)	Separate tickets/cards are needed to access different services	Single card and/or device to access all services	
Booking integration (i.e. can the same platform be used to book all transport services in the Scheme?)	Bookings when needed must be made with the service provider	Bookings when needed can be made through a single digital platform	
Costs	\$500 per month for unlimited access to all services	No monthly cost for pay-as-you-go access to all services	

Which of these service schemes do you prefer more?

Scheme A
 Scheme B

Would you purchase this scheme, if it was available in the market today?

Yes
 No

What kind of trips would you use this scheme for? Please select all that apply. If you wouldn't use this scheme, you can skip this question.

To get to place of employment or education
 To get to a friend or family member's place of residence
 To run errands, like shop for groceries, bank visits, see the doctor, etc.
 For social trips, like eating out, watching a movie at a theatre, visiting a bar, etc.

4. Discrete choice model of consumer preferences for MaaS

Data from the hypothetical scenarios, such as the one shown in Figure 1, was used in conjunction with other geographic and demographic information collected as part of the survey to estimate latent class choice models (LCCMs) of consumer preferences for MaaS. We estimated a number of different model specifications, where we varied the explanatory variables, the functional form of the utilities, and the number of classes. The final model specification was determined based on a comparison across different measures of fit, such as the Akaike and Bayesian information criteria, and behavioral interpretation.

The final model specification identified five distinct segments, or classes, in our sample that differ in terms of their preferences for MaaS. We summarize key differences across the five classes identified by the final model specification in Table 5. The classes have been ordered in terms of their decreasing willingness to use MaaS, and their increasing dependence on the private car.

In going from left to right, there are several general trends to be observed. In particular, willingness to use MaaS is correlated with age and life cycle stage. Young and middle-aged individuals who are either single or married, with or without children at home, are far more likely to use MaaS. In contrast, older individuals whose children have left home are most unwilling to use MaaS. Education and employment are strongly correlated with willingness to use MaaS as well, with more educated and employed individuals being more likely to use MaaS.

Current patterns of travel behaviour and attitudes towards existing transport modes and services serve as excellent indicators of willingness to use MaaS. Individuals unwilling to use MaaS have lower assessments of public transport services in their local neighbourhoods, are generally not open to the idea of carsharing, and are more likely to report that private car ownership is a necessity where they live. And the converse is true for individuals most willing to use MaaS.

The higher an individual's perceived travel costs, the more likely they are to use MaaS. Separately, we also found that most individuals in our sample had underestimated their weekly travel expenditures, in particular the costs of private car ownership. The two findings together suggest that making consumers more aware of the marginal costs of private car ownership and use might be an important mechanism for increasing MaaS' appeal.

Our model is able to identify multiple niche markets for MaaS, based on current travel behaviour patterns. In particular, individuals with high travel needs, individuals with high rates of motorcycle ownership and individuals with high dependence on mobility devices are very receptive to the concept of MaaS, and show strong willingness to use the service if it were available in the market today.

Table 5: High-level summary of different market segments, or classes

	Class I: MaaS enthusiasts	Class II	Class III	Class IV	Class V: Car dependents
Share of the Australian population	14 per cent	7 per cent	17 per cent	22 per cent	41 per cent
Average MaaS purchase probability	87 per cent	51 per cent	33 per cent	2 per cent	1 per cent
MaaS use	Likely to use for all travel	Most likely to use for one-off social trips		-	-
Attitudes towards MaaS	MaaS could help reduce car dependence and car ownership			MaaS unlikely to have effect on car dependence or car ownership	
Geography	Evenly spread across metro, regional and remote areas	More likely to live in metro areas		More likely to live in regional and remote areas	
Demography	More likely to be younger, male, college educated, employed, have children at home	More likely to be middle aged, female, college educated, high household income	More likely to be college educated, single and living with parents, high household income	More likely to be old, female, not college educated, retired, empty nesters	More likely to be old, not college educated, retired, empty nesters
Current travel behaviour and attitudes	High overall travel needs, high motorcycle ownership, high use of mobility devices	Negative opinion of private car ownership and use; open to carsharing		Low opinion and infrequent use of public transport and carsharing	
Average self-reported travel costs	\$185 per capita per week	\$121 per capita per week	\$136 per capita per week	\$98 per capita per week	\$107 per capita per week

5. Policy analysis

We examine some of the implications of our findings from the discrete choice model for transport practitioners and policy-makers interested in MaaS. On average, our model finds that consumers prefer pay-as-you-go schemes twice as much as prepaid schemes that offered unlimited access.

Figure 5 illustrates consumer preferences for access to different transport modes, as a function of the subscription model, in terms of average demand elasticities as estimated by the model reported in Section 4.2. For example, on average and all else being equal, pay-as-you-go schemes that offer access to local public transport services are 12 per cent more likely to be purchased than pay-as-you-go schemes that do not offer access to the same. For pay-as-you-go schemes, local public transport is by far the most popular mode, followed by long-distance public transport (i.e. regional bus and train services), taxis, car rentals and rideshare services. Carshare and bikeshares services have limited appeal. For prepaid schemes that offer unlimited access, local public transport and taxis are the only two modes that are strongly preferred. These findings indicate the inclusion of which transport modes is most critical to the adoption of MaaS schemes among Australian consumers.

Table 6 enumerates adoption rates of different MaaS schemes among Australian consumers, as predicted by our model. For the sake of simplicity, all our scenarios assume that the MaaS service offers full planning, ticketing and booking integration; and access to both real time information and personalization features. By and large, our model indicates that there is definitely a market for MaaS in Australia. MaaS schemes that offer pay-as-you-go access to transport modes have a predicted adoption rate of between 30 and 46 per cent, depending on

Figure 5: Average demand elasticities for pay-as-you-go and unlimited bundled MaaS schemes, as a function of access to different transport modes

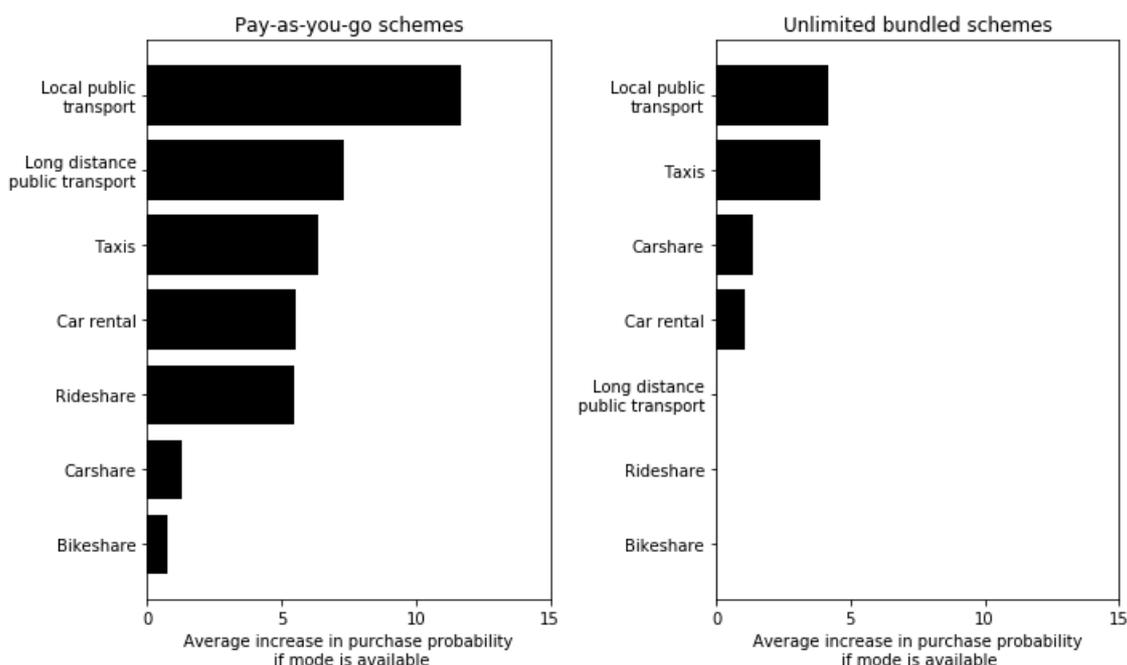


Table 6: Predicted adoption of different MaaS schemes

MaaS scheme (all schemes assumed to have full planning, ticketing and booking integration; real time information; and personalization features)	Predicted share of Australian population that would purchase scheme	
Pay-as-you-go access to all modes	No monthly subscription costs	45.9%
	\$5 monthly subscription	39.5%
	\$10 monthly subscription	37.0%
Pay-as-you-go access to local public transport, long distance public transport and taxis	No monthly subscription costs	35.8%
	\$5 monthly subscription	31.8%
	\$10 monthly subscription	29.4%
Unlimited access to local public transport and taxis	\$500 monthly subscription	18.1%
Unlimited access to local public transport	\$150 monthly subscription	17.4%

the transport modes that they offer access to and their monthly subscription costs. Even prepaid schemes that offer unlimited access to local public transport and taxi services for a high monthly cost of \$500 have a high predicted adoption rate of 18 per cent.

5. Conclusions

MaaS offers potential consumers access to multiple transport modes and services, owned and operated by different mobility service providers, through an integrated digital platform for planning, booking and payment. This study reviewed the current status of MaaS in Australia. We surveyed 3,985 geographically and demographically representative Australians nationwide, to understand consumer demand and willingness to pay for MaaS in Australia. Our analysis confirmed that there is definitely a market for MaaS in Australia. For example, we find that 32 per cent of the Australian population would adopt a MaaS scheme that offers pay-as-you-go access to local public transport, long distance public transport and taxi services for a monthly charge of \$5 if such a service were available in the market today. Given both the latent consumer demand for MaaS, and the interest shown by industry in delivering such a service, it is likely only a matter of time before MaaS becomes commercially available in Australia.

Acknowledgements

The authors would like to thank the following organizations for providing funding support for this study: Intelligent Transport Systems (ITS) Australia, iMOVE Cooperative Research Centre (CRC), Transport for New South Wales (TfNSW), Queensland Transport and Main Roads (TMR), Department of Transport in Western Australia, Royal Automobile Association (RAA) of South Australia, MaaS Australia, Keolis Downer, Transdev Australasia, Cubic Transportation Systems, and the University of South Australia. The authors would also like to thank the following individuals for their useful feedback on different aspects of this study:

Mark Borlace, Segolene Deeley, Hany Eldaly, Claire Imray, Tagrid Kaddouri, Joffre Swait and Claire Thompson.

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