

The Australian market for on-demand transport¹

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Abstract

On-demand transport (ODT) refers to demand responsive transport services that use a fleet of vehicles to provide shared flexible transport to consumers, when and where they need it. This study surveyed 3,985 geographically and demographically representative Australians nationwide, to understand consumer demand and willingness to pay for ODT in Australia. Our analysis finds that the current market for ODT services in Australia is small. For example, for an ODT service that costs roughly the same as UberX's ridesharing service, and offers comparable level-of-service, our analysis predicts that only 17 per cent of the Australian population can be expected to use the service a few times a week or more. However, shared electric autonomous vehicles could significantly change the business case for ODT services, by enabling on-demand door-to-door transport services at a fraction of the cost of similar existing services. Our analysis finds that while consumers are willing to pay, on average, 0.28\$/km more to avoid sharing a vehicle with other passengers and 0.17\$/km more for door-to-door service, cost is the most important determinant of ODT use. For an ODT service that provides the same level-of-service as UberX, but at a fractional cost of \$0.30 per km, 31 per cent of the Australian population can be expected to use the service a few times a week or more. And this figure is likely to be larger once we account for more long-term changes in lifestyles that might accompany the introduction of these services. Finally, we find that willingness to use ODT is strongly correlated with age and lifecycle stage: young individuals who are employed full-time are most likely to use ODT; older adults who have retired from the workforce and whose children have left home are least likely to use ODT.

1. Introduction

On-demand transport (ODT) refers to demand responsive transport services that use a fleet of vehicles to provide shared flexible transport to consumers, when and where they need it. The objectives of this paper are two-fold: (1) to explore Australian consumer preferences for ODT; and (2) to support the development of suitable ODT services for the Australian community. In service of these objectives, we surveyed 3,985 Australians nationwide in March 2018 on their attitudes and opinions towards different ODT services, and their willingness to pay for use of these services. This study reports some of the key findings that emerged from our analysis of this data.

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 consumer

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

preferences for ODT services. Section 4 draws out some of the key findings from our analysis for transport practitioners and policy-makers interested in the design, provision and regulation of ODT services. Section 5 concludes with a discussion of key findings and directions for future research.

2. Survey instrument

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:

Section I – 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.

Section II – Preferences for on-demand transport (ODT) services: Each respondent was presented four different scenarios, such as the one shown in Figure 1. Respondents were asked to imagine that they have access to the hypothetical ODT service described in the scenario in terms of four attributes: price, vehicle sharing, booking, and route information. The attributes were varied systematically across scenarios and respondents. Given the length of the survey, respondents were given four scenarios to keep cognitive burden reasonable. For each scenario, respondents were asked to indicate how frequently they would use such a service, and for what kinds of trips.

Section III – Preferences for Mobility-as-a-Service (MaaS) schemes: Respondents were asked about their awareness of and familiarity with MaaS. Each respondent was presented four different scenarios, where they were presented two different hypothetical MaaS schemes. Respondents were asked to indicate which scheme they prefer, if they would purchase the preferred scheme if it were available in the market today, and for what kinds of trips would they use the scheme. We exclude more details on this section of the survey, as it is not directly related to ODT and not relevant to the present study's objectives.

Section IV – 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.

Section V – 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 ODT services

Scenario 1 of 4

Imagine that the following on-demand transport (ODT) service is available in your region:
Hover your cursor over the blue text for more information.

	On-demand transport (ODT) service
Price	\$1.00 per kilometre
Vehicle sharing	You may have to share the vehicle with at most 6 other passengers
Booking	Yes, you may need to book the service a few hours ahead of time
Route information	Pick-up and drop-off at designated bus stops along a fixed route

How frequently would you use this service?

Daily
 Few times a week
 Few time a month
 Rarely or never

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

To get to a 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 a doctor, etc.
 For social trips, like eating out, watching a movie at a theatre, visiting a bar, etc.

3. Estimation results

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 ODT. 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. All models were estimated using data from 3,985 individuals, each of whom were observed to make four hypothetical choices. 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 ODT services. The model has a McFadden's adjusted R-squared of 0.169. We summarize key differences across the five classes identified by the final model specification in Table 1. The classes have been ordered in terms of their decreasing willingness to use ODT, and their increasing dependence on the private car.

In going from left to right across Table 1, there are several general trends to be observed. In particular, willingness to use ODT 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 ODT. In contrast, older individuals whose children have left home are most unwilling to use ODT. Education and employment are strongly correlated with willingness to use ODT as well, with more educated and employed individuals being more likely to use ODT.

Our model is able to identify several niche markets for ODT services that early trials should target. These include employed working men who regularly commute by public transport; motorcycle owners, who likely use their motorcycles as a cheap and convenient substitute to both public transport and private car ownership; and mobility device users, who are likely dependent on others to fulfill their mobility needs, and would potentially welcome the independence offered by ODT services.

4. Policy implications

In this section, we explore some of the policy implications of our model results. Table 2 lists average consumer willingness to pay for different ODT service attributes. Consumers are willing to pay most to avoid sharing a vehicle with other passengers: 0.28\$/km. Recall that the ODT scenarios varied the potential number of other passengers between 0 and 10. However, our model did not find consumers to be sensitive to the number of passengers, only whether they have or don't have to share the vehicle with other passengers. Our finding is in disagreement with studies conducted by Queensland TMR, following ODT trials in the state, that found consumers to be most sensitive to the potential number of other passengers that they might have to share the service with (as that number serves as a proxy for level of service, in terms of door-to-door travel times). Note however that most individuals in our sample have no prior experience with ODT services, and their sensitivity to particular service attributes might likely change once they have actually used an ODT service.

Table 1: High-level summary of different market segments, or classes

	Class I: Innovators	Class II: Early adopters	Class III: Potential early majority	Class IV: Potential late majority	Class V: Potential laggards
Share of the Australian population	3 per cent	10 per cent	9 per cent	20 per cent	58 per cent
ODT use	Daily; for all travel, especially commuting	Few times a week; for all travel	Few times a month; for mostly social trips	Few times a year; for mostly social trips	Rarely or never
Sensitivity to service attributes	High willingness to pay for door-to-door service (\$0.58 per km)	High willingness to pay for avoiding sharing a vehicle (\$0.36 per km)	Not very sensitive to any service attributes	High sensitivity to costs	High willingness to pay for door-to-door service (\$0.69 per km)
Attitudes towards ODT	ODT could help reduce car dependence and car ownership		ODT could help reduce car dependence, but not car ownership		ODT unlikely to affect car dependence or ownership
Geography	Proportionally spread across metro, regional and remote areas				Regional and remote residents more likely to belong to this persona
Demography	Young; highly educated; employed; male; have children at home; low income; disabled; residents of outer regional and remote areas	Young; highly educated; male; have children at home; low income; disabled	Middle aged; residents of inner city areas; high incomes	Don't have children at home; young; median incomes; residents of outer regional and remote areas	Old; retired; empty nesters; not college educated; high incomes
Current travel behavior	High motorcycle ownership rates; high dependence on use of mobility devices; high public transport use		Low motorcycle ownership rates; low dependence on use of mobility devices; low public transport use		

Table 2: Consumer willingness to pay for ODT service attributes

Willingness to pay to be able to...	Amount	Comments
Book ODT service in real time	\$0.10 per km	-
Have door-to-door service	\$0.17 per km	No preference between fixed route fixed schedule services and flexible route flexible schedule services
Avoid sharing a vehicle	\$0.28 per km	Number of passengers that the vehicle is shared with did not have a statistically significant effect

Table 3: Predicted usage rates of different ODT services

ODT service	Predicted usage			
	Daily	Few times a week	Few times a month	Rarely or never
\$1.15 per km (comparable to UberX prices in Melbourne); no sharing; real time booking; and door-to-door service	5%	12%	23%	61%
\$0.70 per km (comparable to bus fares in Sydney); sharing; no real time booking; fixed route fixed schedule	4%	11%	21%	65%
\$0.30 per km (comparable to shared electric autonomous cars); no sharing; real time booking; and door-to-door service	11%	20%	18%	51%

Consumers are willing to pay 0.17\$/km for door-to-door service. However, we did not find the willingness to pay for flexible routes and/or flexible schedules to be statistically significant for any of the classes or the sample as a whole. Again, we speculate this may be due to consumer inexperience with ODT services, and that the value of flexible routes and schedules might only become apparent to consumers once they have actually used an ODT service. Finally, consumers are willing to pay a nominal 0.10\$/km to be able to book the service in real time, as opposed to having to book the service several hours in advance.

Table 3 enumerates usage rates across the national population, as predicted by our model for different potential ODT services. For an ODT service that costs roughly the same as UberX’s ridesharing service, and offers comparable level-of-service, 17 per cent of the national population can be expected to use the service a few times a week or more. For an ODT service that costs roughly the same as public bus services, and offers comparable level-of-service, 15 per cent of the national population can be expected to use the service a few times a week or more. Note that our model predicts relatively similar levels of usage for UberX-like ODT services and public bus-like ODT services. Superficially, the finding corroborates evidence from other studies that indicate that rideshare services such as UberX are viewed by consumers as substitutes for traditional public transport services, and not necessarily complements.

Finally, for an ODT service that provides the same level-of-service as UberX, but at a fractional cost of \$0.30 per km, a significantly larger 31 per cent of the national population can be expected to use the service a few times a week or more. The price point for such a service could potentially be achieved through new transport technologies and services, such as shared electric autonomous vehicles. Our predicted adoption rates for such a service serves to underscore that while consumers are willing to pay extra for improved level-of-service, cost is ultimately the most important determinant of ODT use. The reader should note further that these predicted adoption rates may be viewed as short-term measures of demand elasticity. Our model does not account for more long-term changes in lifestyles that might accompany the introduction of ODT services, such as reductions in private car ownership levels or changes in residential settlement patterns, which could potentially increase the use of these services even further.

5. Conclusions

This study undertook an analysis of consumer data collected from 3,985 Australians nationwide on their attitudes and opinions towards different ODT services, and their willingness to pay for use of these services. We find that the current market for ODT services is small. For example, for an ODT service that costs roughly the same as UberX's ridesharing service, and offers comparable level-of-service, our analysis predicts that only 17 per cent of the national population can be expected to use the service a few times a week or more.

However, shared electric autonomous vehicles could significantly change the business case for ODT services, by enabling on-demand door-to-door transport services at a fraction of the cost of similar existing services. Our analysis finds that while consumers are willing to pay, on average, 0.28\$/km more to avoid sharing a vehicle with other passengers and 0.17\$/km more for door-to-door service, cost is the most important determinant of ODT use. For an ODT service that provides the same level-of-service as UberX, but at a fractional cost of \$0.30 per km, 31 per cent of the national population can be expected to use the service a few times a week or more. And this figure is likely to be larger once we account for more long-term changes in lifestyles that might accompany the introduction of these services.

Finally, we find that willingness to use ODT is strongly correlated with age and lifecycle stage: young individuals who are employed full-time are most likely to use ODT; older adults who have retired from the workforce and whose children have left home are least likely to use ODT. This is unfortunate, as many studies have argued that ODT services could provide a viable transport alternative for older adults who can no longer drive (e.g. Fagnant et al., 2015). Older adults are typically the slowest to adopt new technologies (Pew Research Center, 2014), and our analysis finds that significant shifts in attitudes and opinions are needed if older Australians are to embrace these new transport service paradigms.

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