Annex 4

Stated Preference Experiment: Online Survey for 16 Cities.

A key feature of the online survey for 16 cities is a stated choice experiment designed to elicit preferences for various MaaS packages. Respondents were shown various alternatives, described by a combination of levels of attributes associated with each mode and non-modal service offers, asked to review them, and decide which one is their most preferred that they would choose if offered in a real market in the future. If none of the offers are appealing, they can simply choose to stay with what they currently do. An example stated preference screen is shown in Figure 1. Each respondent was shown two scenario screens and asked to make a choice in each one. A key objective of the stated preference experiment is to understand what modal and non-modal services open opportunities for improved accessibility that might be integrated into future MaaS products.

The stated preference experiment was answered by 822 respondents, so in total we have 1,644 choices (two per respondent). A descriptive profile of respondents is presented in Table 1, which shows the characteristics that had a statistically significant influence on preferences towards the MaaS schemes. At the end of the survey, participants were asked if they would intend to take up on the non-modal service offers (home delivery, shopping or media streaming services discounts and benefits). Less than half of participants said they would intend to use the home delivery services, while more than 60% said they would use the shopping or media streaming services.

Table 1: Individual descriptives

Variable	Mean (std dev)
Personal annual income (000AUD$)	59.930 (40.01)
Age (years)	41.619 (16.63)
Drives (1,0)	91.8%
Owns a car and is willing to make it available through CCC[1] (1,0)	79.5%
Intends to take up on the offer of home delivery discounts and benefits (1,0)	43.9%
Intends to take up on the offer of shopping discounts and benefits (1,0)	61.1%
Intends to take up on the offer of media streaming services discounts and benefits (1,0)	63.5%
Located in Griffith (1,0)	4.2%
Located in Coffs Harbour (1,0)	6.2%

The descriptive statistics for the cost variables and bundle fees as presented in the stated preference experiment are shown in Table 2. The experiment design made sure the bundle plans A and B were statistically equivalent, and they presented discounts relative to the current situation, which can be seen in the table. The last column of Table 2 represents, for the transport mode variables, the percentage of respondents revealing use of that mode in the last 7 days or would use the mode if they selected a bundle plan included the mode. For the services, it represents the percentage of respondents currently having a weekly or monthly spending on that service. Overall, around 20% of respondents were using or intended to use local bus and taxi/rideshare, while around 15% of participants used or intended to use community transport and on-demand bus. The lowest percentage was car ridesharing, where only 12% of respondents said they used or intended to use it. As presented

[1] A car community club (CCC) matches private car trips between drivers and potential users. The CCC would be based on no fee membership for drivers and residents where safety and security of members can be ensured, and safety of vehicles can be logged. This could be operated under charitable status. Successful matching and expediting will be associated with a donation which will be dispersed to the owner of the CCC and the driver of the private car.

in Eq. (1) and Eq. (2), below, the car sharing cost was statistically significant for people that currently drive. The costs for the services appear higher since these are weekly or monthly costs instead of per kilometre.

Table 21: Descriptive statistics for weekly costs of multi-services and bundle fee

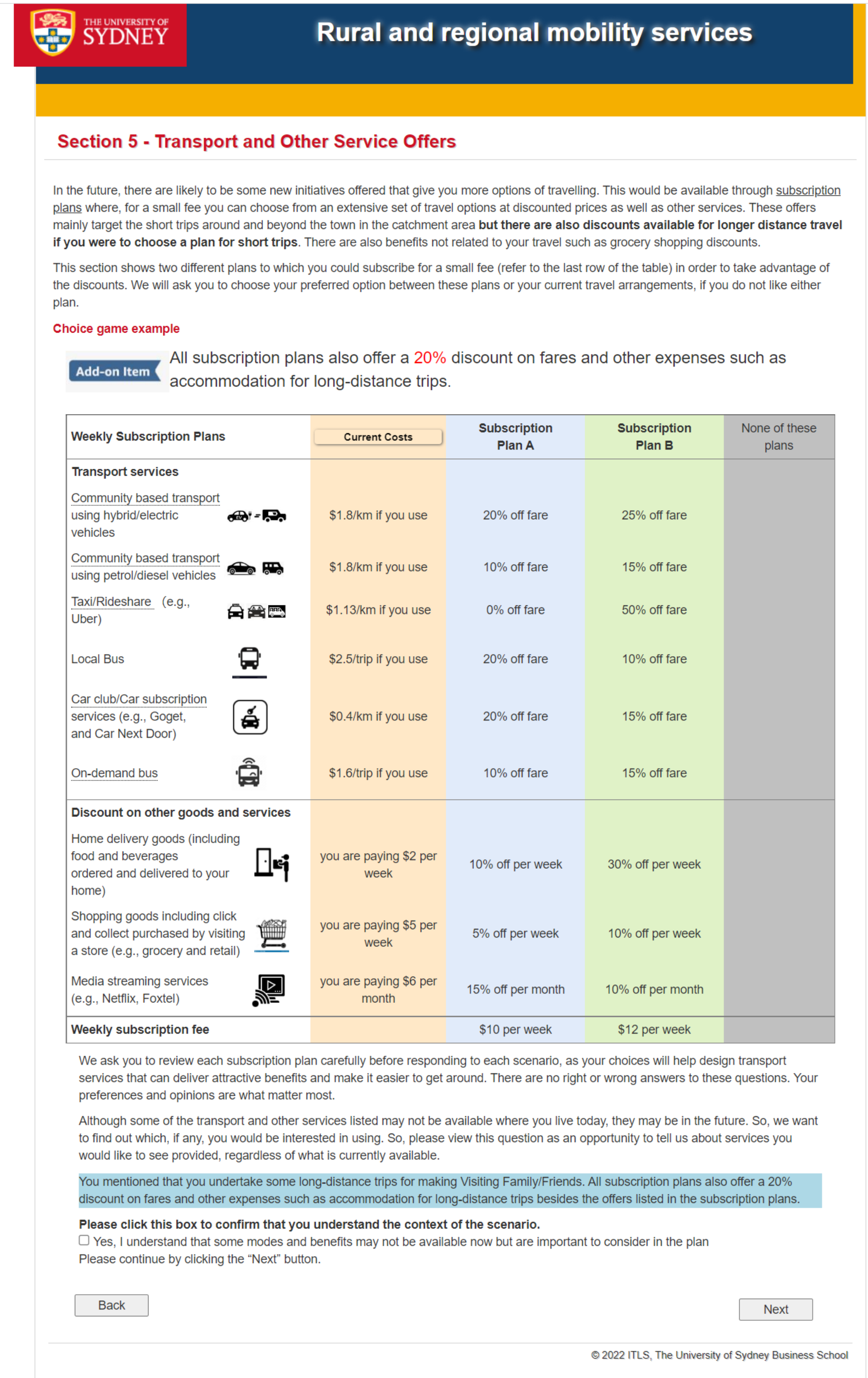
Variables	Mean (std dev) Plan A	Plan B	Current	Use %*
Cost for electric community transport ($/km)	1.524 (0.18)	1.529 (0.18)	1.970 (0.18)	15.6%
Cost for non-electric community transport ($/km)	1.707 (0.26)	1.710 (0.26)	1.953 (0.26)	13.2%
Cost taxi/rideshare ($/km)	2.041 (0.56)	2.032 (0.55)	2.469 (0.65)	21.1%
Cost local bus ($/km)	3.087 (0.91)	3.121 (0.88)	4.139 (1.00)	19.8%
Cost on-demand bus ($/km)	3.477 (0.84)	3.482 (0.84)	3.977 (0.93)	14.8%
Cost car ridesharing ($/km)	0.566 (0.24)	0.562 (0.24)	0.728 (0.31)	11.8%
Media streaming cost ($/month)	27.380 (35.63)	27.461 (35.97)	33.237 (43.24)	78.0%
Shopping costs ($/week)	109.097 (108.09)	108.771 (107.96)	124.496 (122.95)	82.3%
Home delivery costs ($/week)	28.793 (54.70)	28.667 (54.51)	33.800 (63.52)	39.0%
Plans fee ($)	7.057 (4.91)	7.166 (4.86)	-	-

*Note: *For the transport services, this variable represents the percentage of participants that said have used that mode in the last 7 days or would use if they select a bundle plan. For non-transport services, this variable represents the percentage of participants that said they currently have a weekly or monthly spending on that service.*

Table 32: Descriptives for number of trips before and after bundle selection per mode of transport

Bundles' mode of transport	Number of trips in the last 7 days	Number of weekly trips if bundle selected
Electric community transport	0.227 (1.50)	0.651 (2.68)
Non-electric community transport	0.457 (2.56)	0.475 (2.47)
Taxi/rideshare	0.522 (2.57)	0.904 (3.03)
Local bus	0.296 (1.95)	0.789 (2.81)
On-demand bus	0.247 (1.76)	0.571 (2.21)
Car ridesharing	0.283 (2.00)	0.453 (2.35)

Note: This table allowed for a maximum of 30 weekly trips per mode of transport (4-6 respondents had to be revised for each mode). These numbers were not included directly in the utility functions, so this assumption does not affect in any way the model results or interpretation.



THE UNIVERSITY OF SYDNEY

Rural and regional mobility services

Section 5 - Transport and Other Service Offers

In the future, there are likely to be some new initiatives offered that give you more options of travelling. This would be available through subscription plans where, for a small fee you can choose from an extensive set of travel options at discounted prices as well as other services. These offers mainly target the short trips around and beyond the town in the catchment area **but there are also discounts available for longer distance travel if you were to choose a plan for short trips**. There are also benefits not related to your travel such as grocery shopping discounts.

This section shows two different plans to which you could subscribe for a small fee (refer to the last row of the table) in order to take advantage of the discounts. We will ask you to choose your preferred option between these plans or your current travel arrangements, if you do not like either plan.

Choice game example

Add-on Item All subscription plans also offer a 20% discount on fares and other expenses such as accommodation for long-distance trips.

Weekly Subscription Plans	Current Costs	Subscription Plan A	Subscription Plan B	None of these plans
Transport services				
Community based transport using hybrid/electric vehicles	$1.8/km if you use	20% off fare	25% off fare	
Community based transport using petrol/diesel vehicles	$1.8/km if you use	10% off fare	15% off fare	
Taxi/Rideshare (e.g., Uber)	$1.13/km if you use	0% off fare	50% off fare	
Local Bus	$2.5/trip if you use	20% off fare	10% off fare	
Car club/Car subscription services (e.g., Goget, and Car Next Door)	$0.4/km if you use	20% off fare	15% off fare	
On-demand bus	$1.6/trip if you use	10% off fare	15% off fare	
Discount on other goods and services				
Home delivery goods (including food and beverages ordered and delivered to your home)	you are paying $2 per week	10% off per week	30% off per week	
Shopping goods including click and collect purchased by visiting a store (e.g., grocery and retail)	you are paying $5 per week	5% off per week	10% off per week	
Media streaming services (e.g., Netflix, Foxtel)	you are paying $6 per month	15% off per month	10% off per month	
Weekly subscription fee		$10 per week	$12 per week	

We ask you to review each subscription plan carefully before responding to each scenario, as your choices will help design transport services that can deliver attractive benefits and make it easier to get around. There are no right or wrong answers to these questions. Your preferences and opinions are what matter most.

Although some of the transport and other services listed may not be available where you live today, they may be in the future. So, we want to find out which, if any, you would be interested in using. So, please view this question as an opportunity to tell us about services you would like to see provided, regardless of what is currently available.

You mentioned that you undertake some long-distance trips for making Visiting Family/Friends. All subscription plans also offer a 20% discount on fares and other expenses such as accommodation for long-distance trips besides the offers listed in the subscription plans.

Please click this box to confirm that you understand the context of the scenario.

☐ Yes, I understand that some modes and benefits may not be available now but are important to consider in the plan

Please continue by clicking the "Next" button.

Back Next

Figure 1: Example stated preference experiment screen

Using the sample described above, a choice and preference model called a mixed multinomial logit model was estimated, which incorporates individual heterogeneity, allowing for different preferences across individuals. Three alternatives were presented to the respondents and included in the models: the first two represent alternative bundle packages and the last one the current travelling pattern of the respondent. The utility functions for the alternatives were formulated as follows:

$$\begin{aligned} U_{Plan_m} = {} & \beta_{Plan_m} + \beta_{CTfare} \cdot \left(Cst_{CTE_m} + Cst_{CTNE_m} \right) + \beta_{TRSh} \cdot Cst_{TRSh_m} + \\ & \beta_{CSubCMC} \cdot \ln\left(Cst_{CSub_m} \right) \cdot D_{CMC} + \beta_{CSubND} \cdot \ln\left(Cst_{CSub_m} \right) \cdot D_{Non-driver} + \\ & \beta_{Bus} \cdot \left(Cst_{Bus_m} + Cst_{OnDBus_m} \right) + \beta_{HD} \cdot \ln\left(Cst_{HD_m} \right) + \beta_{Shop} \cdot \ln\left(Cst_{Shop_m} \right) + \\ & \beta_{Media} \cdot \ln\left(Cst_{Media_m} \right) + \beta_{fee} \cdot \exp\left(fee_m \right) / 100000 + \beta_{Age} \cdot age + \varepsilon_{plan_m} \end{aligned} \tag{1}$$

$$\begin{aligned} U_{Curr} = {} & \beta_{CTfare} \cdot \left(Cst_{CTE} + Cst_{CTNE} \right) + \beta_{TRSh} \cdot Cst_{TRSh} + \\ & \beta_{CSubCMC} \cdot \ln\left(Cst_{CSub} \right) \cdot D_{CMC} + \beta_{CSubND} \cdot \ln\left(Cst_{CSub} \right) \cdot D_{Non-driver} + \\ & \beta_{Bus} \cdot \left(Cst_{Bus} + Cst_{OnDBus} \right) + \beta_{HD} \cdot \ln\left(Cst_{HD} \right) + \beta_{Shop} \cdot \ln\left(Cst_{Shop} \right) + \\ & \beta_{Media} \cdot \ln\left(Cst_{Media} \right) + \varepsilon_{curr} \end{aligned} \tag{2}$$

where β_{plan_m}represents the plan-specific constant for bundle package m; $Cst_{CTE_m}$and Cst_{CTNE_m} denote the cost of electric and non-electric community transport under bundle package m, respectively; Cst_{TRSh_m} denotes the cost of taxi/rideshare; Cst_{CSh_m}denotes the cost of car club/subscription; Cst_{Bus_m} denotes the cost of the local bus; and Cst_{OnDBus_m} denotes the on-demand bus costs. Regarding the services attributes, Cst_{HD_m} represents weekly home delivery costs; Cst_{Shop_m}denotes the weekly shopping costs; $Cst_{Media_m} denotes$ the monthly media streaming costs. D_{Driver} is a dummy variable equal to 1 if the participant drives, 0 otherwise; D_{CMC} is a dummy variable if the individual owns a car and is willing to make it available through the Car Community Club (CCC); age represents the age of the individual; and fee_m represents the subscription fee of bundle package m.

Costs were calculated based on the levels presented in the choice experiment and only for those respondents indicating they had intention to use. This intention came from the respondent revealing they had used the mode in the past 7 days or they would use it if available through a bundle; and for the services if they said they plan to take up on the bundle offers.

The model results are presented in Table 4. All parameter estimates are statistically significant at the 90% confidence level or better, except for the mean parameter of the car club/subscription cost. The standard deviation of the car club/subscription cost is highly significant, however. This suggests that there is a high level of divergency in preferences towards the car club/subscription mode for those respondents that drive and who said they would be willing to share their car (see Section on Car Community Club Innovation).

Table 4: **Model results – mean and t-value**

Description	Acronym	Alternative	Mean	t-value
Alternative specific constant	ASCPLAN	Plans	-0.319	-1.890
Cost for community transport (electric and non-electric) if would use it now or in future ($/km)	BCTFARE	All	-0.839	-2.330
Cost taxi/rideshare if would use it now or in future ($/km)	BRSHFARE	All	-1.640	-4.680
Ln(Cost car club/subscription if would use it now or in future ($/km)) for non-drivers	BCSHNDFR	All	-8.277	-1.700
Ln(Cost car club/subscription if would use it now or in future ($/km)) for drivers who are willing to share their car in CCC ***- mean***	BCSHCCC	All	0.234	0.170
- standard deviation	NsBCSHCM	All	6.455	3.740
Cost local or on-demand bus if would use it now or in future ($/km)	BBUSFARE	All	-0.363	-3.370
Ln(Home delivery cost if intends to use it in bundle ($/week))	BHOMECST	All	-	-
Ln(Shopping cost if intends to use it in bundle ($/week))	BSHOPCST	All	-1.098	-2.100
Ln(Media streaming cost if intends to use it in bundle ($/month))	BMEDIACS	All	-3.571	-8.690
exp(Plans fee ($))/100,000	BPLNFEE	Plans	-0.0001	-2.350
Age (years)	BAGE	Plans	-0.017	-5.010
Griffith (1,0)	BGRIFF	Current	-0.477	-1.750
Coffs Harbour (1,0)	BCOFFS	Current	-0.674	-3.010
Number of parameters			***13***	
Sample size			***1644***	
Restricted log-likelihood			***-1806.12***	
Log-likelihood at convergence			***-1668.74***	
AIC/N			***2.046***	

Using the model results, we can estimate the point elasticities for each individual q, which represent the percentage change in the probability of choosing alternative i given a 1% change in the continuous explanatory variable x_{ij} .

This has been estimated for bundle plans and this shows for a 10 per cent increase in the cost for different modes of transport, the probability of choosing the bundles would decrease between 0.76 and 4.20 percentage points. Given that the bundles offer discounts, we will interpret these elasticities in terms of decreasing the weekly or monthly costs. The order of the most to the least influential modes of transport in terms of the support for bundles are:

1) Car club/subscription for **non-drivers**: if the discount offered meant a 10% decrease in weekly cost of using this mode, it would result in a 4.20% increase in the probability of choosing a plan for non-drivers.
2) Taxi/rideshare*: if the discount meant a 10% decrease in weekly cost of using this mode, it would result in a 2.93% increase in the probability of choosing a plan.
3) Local bus*: if the discount meant a 10% decrease in weekly cost of using this mode, it would result in a 1.03% increase in the probability of choosing a plan.
4) Electric community transport*: if the discount meant a 10% decrease in weekly cost of using this mode, it would result in a 0.85% increase in the probability of choosing a plan.
5) On-demand bus**: if the discount meant a 10% decrease in weekly cost of using this mode, it would result in a 0.83% increase in the probability of choosing a plan.

6) Non-electric community transport**: if the discount meant a 10% decrease in weekly cost of using this mode, it would result in a 0.76% increase in the probability of choosing a plan.

However, the differences between the elasticities for the taxi/rideshare and local bus are not statistically significant with a 90% confidence level and shown in the above list by *. In addition, the differences between the elasticities for the on-demand bus, electric and non-electric community transport are not statistically significant with a 90% confidence level, shown in the above list by **. This means that it is not possible to distinguish between taxi and mode share on the one hand and the different community transport vehicles and on-demand bus.

It is also relevant to add that the elasticity for car club/subscription for **drivers who are willing to share their car in a CCC** has an opposite sign but the mean estimate was not statistically significant with a 95% confidence level although its standard deviation was highly significant suggesting that on average, drivers who are willing to share their car through CCC have significant divergence in terms of their valuation of the discount offered for car club/subscription. Simply put, some drivers prefer a higher discount, while others prefer a lower discount. This suggests that the latter drivers might associate a higher discount with receiving a lower percentage of their trip cost back to them when sharing their car.

In terms of services, the order from the most to the least influential in terms of the support towards the bundles are – for all only considering those individuals that currently use these services:

1) Media streaming: if the discount meant a 10% decrease in its monthly cost of media streaming, it would result in a 14.1% increase in the probability to choose a plan.
2) Shopping: if the discount meant a 10% decrease in its weekly shopping cost, it would result in a 4.3% increase in the probability to choose a plan.
3) Home delivery: it was not statistically significant in the model with a 95% confidence level, suggesting it does not have a substantial influence on the decision to choose a bundle plan.

The table of results also includes elasticities for the two location variables of Griffith and Coffs Harbour: residents from these towns are 2.2% and 1.4% more likely to choose a bundle plan than the other locations, respectively. As expected, the plan fee has a negative elasticity, and it has an exponential transformation. Figure 2 shows the changes in the fee elasticity relative to different plan fees shown in the experiment. When the plan fee falls below $15, the elasticity is almost 0, showing that respondents are not very sensitive towards the plan fee if it offers good modes and services discounts (as discussed above). However, when the plan fees are high (above $15) then the elasticity increases exponentially.

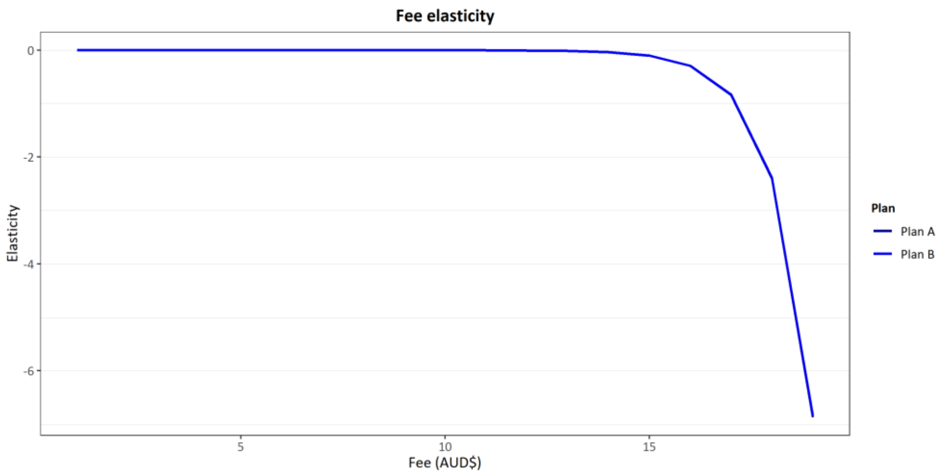


Figure 2: Simulated fee elasticities