The MaaS Journey: Rationale and Service Delivery

ITLS MaaS Briefing Seminar

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Yale Zhuxiao Wong

Institute of Transport and Logistics Studies

University of Sydney Business School

yale.wong@sydney.edu.au

Supervisors: Prof David A Hensher

Prof Corinne Mulley

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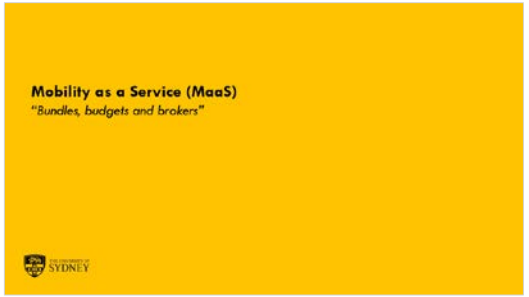
Overview

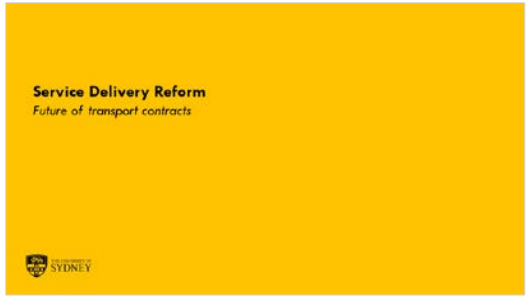
1. Futures

2. Implications

3. MaaS



4. Contracts



5. Survey

6. Results

Divergent Transport Futures

Technologies and trends

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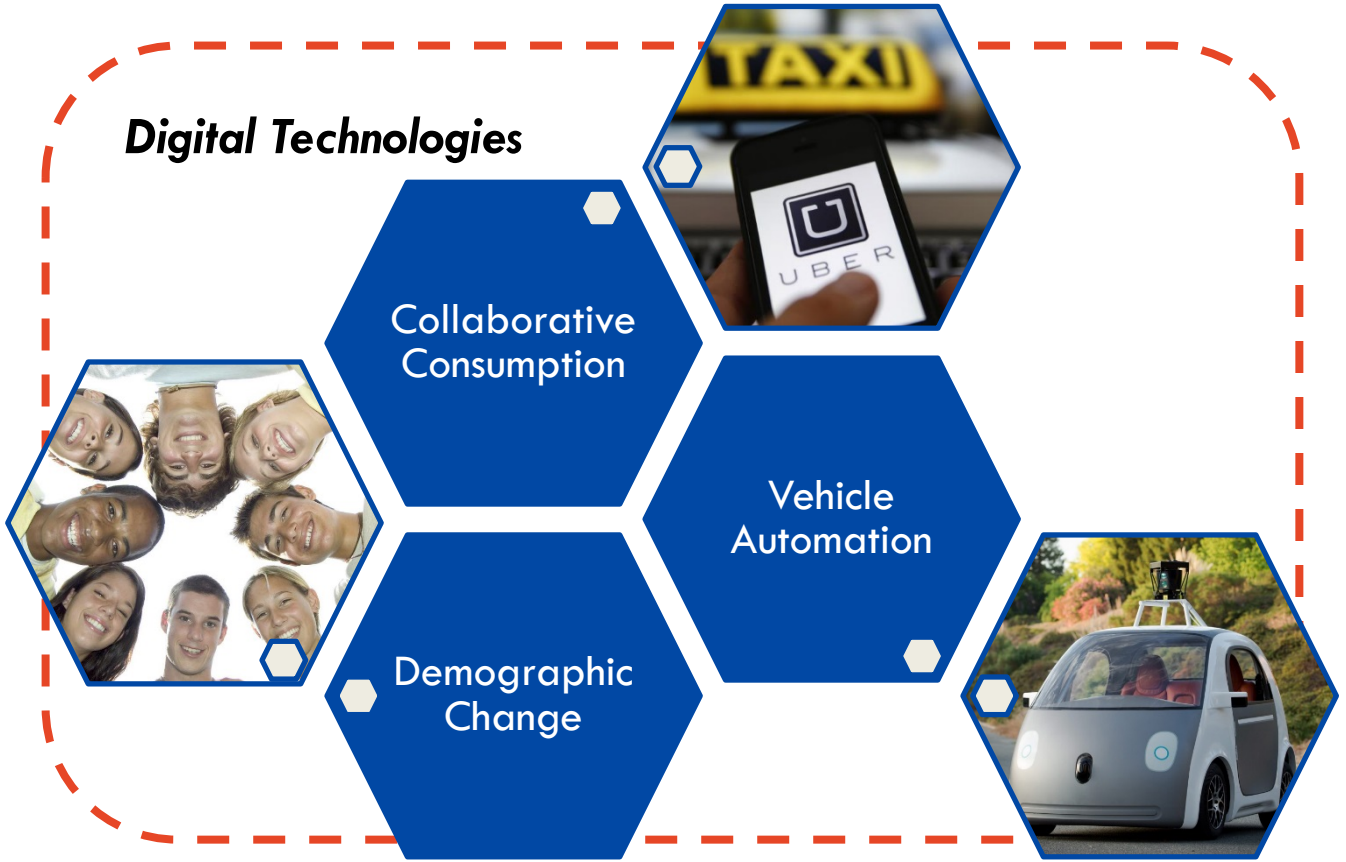
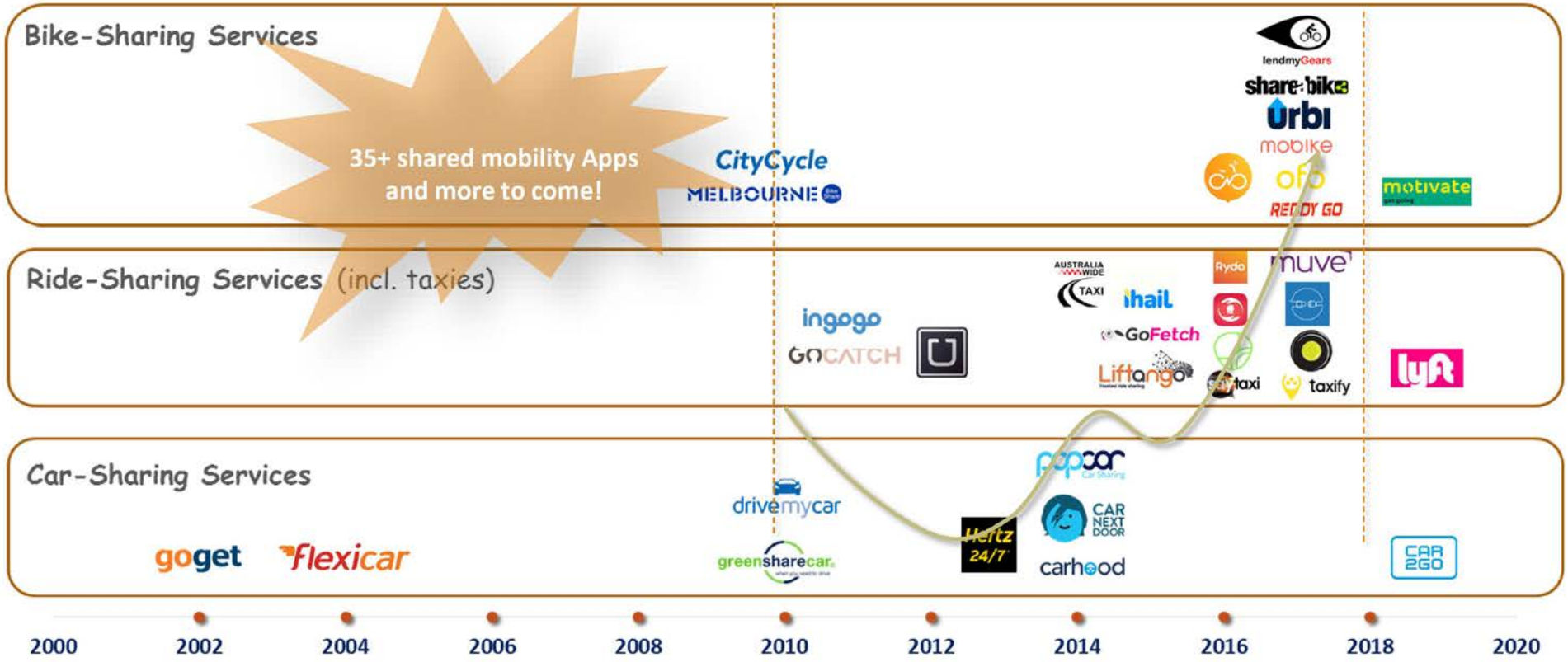
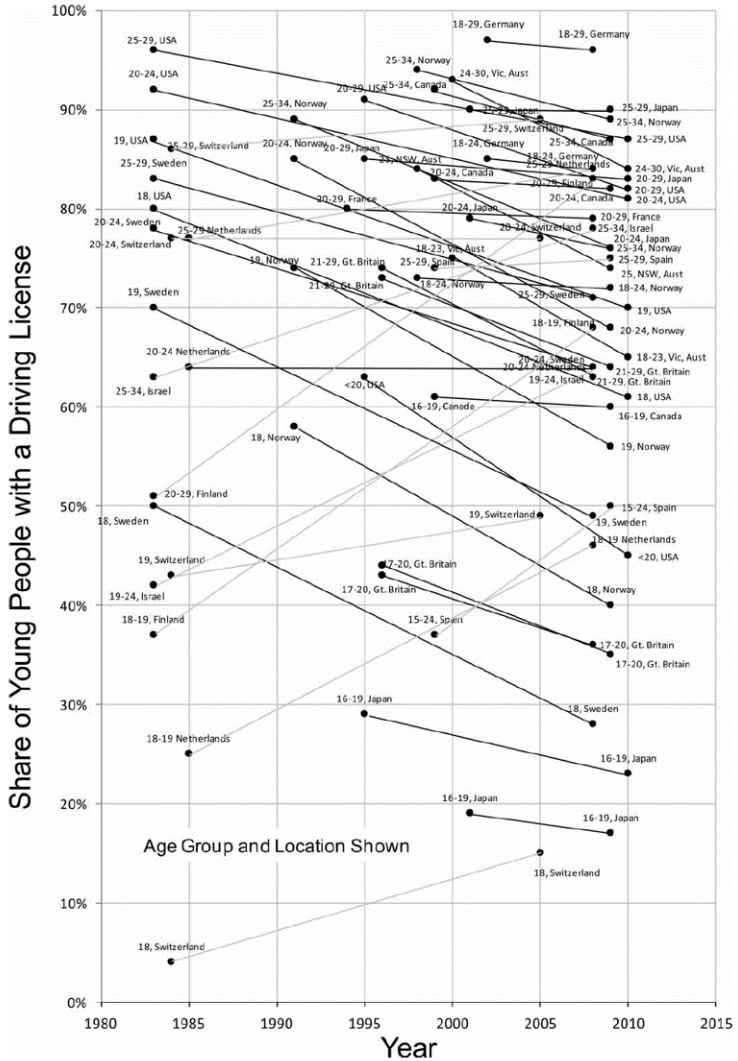
Emerging transport paradigm




Bike-Sharing Services
35+ shared mobility Apps and more to come!
CityCycle
MELBOURNE
lendmyGears
share-bike
Urbi
mobike
ofo
REDDY GO
motivate
Ride-Sharing Services (incl. taxies)
ingogo
GOCATCH
AUSTRALIA WIDE TAXI
ihail
GoFetch
Liftango
Rydo
muve
taxify
lyft
Car-Sharing Services
goget
flexicar
drivemycar
greenshare car
Hertz 24/7
popcar
CAR NEXT DOOR
carhood
CAR 2GO
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

Collaborative consumption and vehicle automation

- Already disrupted taxi industry
- Interface with public transport: both **competes** and **complements** depending on market and demographics (Rayle et al., 2016)
- Ownership model—
  - Own and share model (Musk, 2016)
  - Universal automated taxi service (Enoch, 2015)
- Impacts on **network efficiency** unclear



Demographic change and digital technologies

- Youth licencing decline across developed countries (Delbosc and Currie, 2013)
- Mixed evidence—due to education/employment or symbolism/ideology
- Difference between sharing information and sharing **space**
- Aging population—transport disadvantage
- Digitalisation of economy—Fourth industrial revolution

Implications for Urban Efficiency

Opportunities and realities

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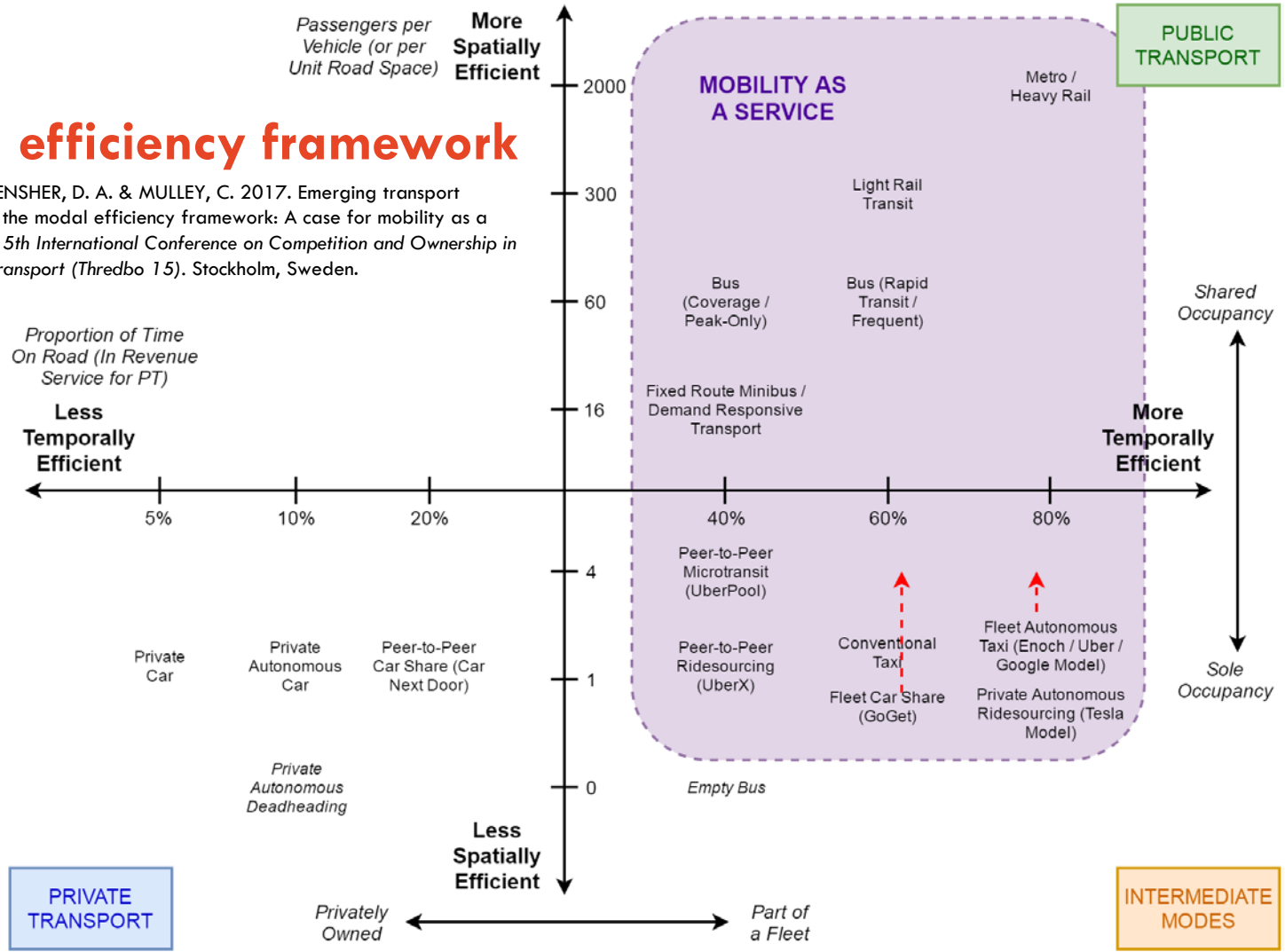
Future scenarios for intermediate mode development

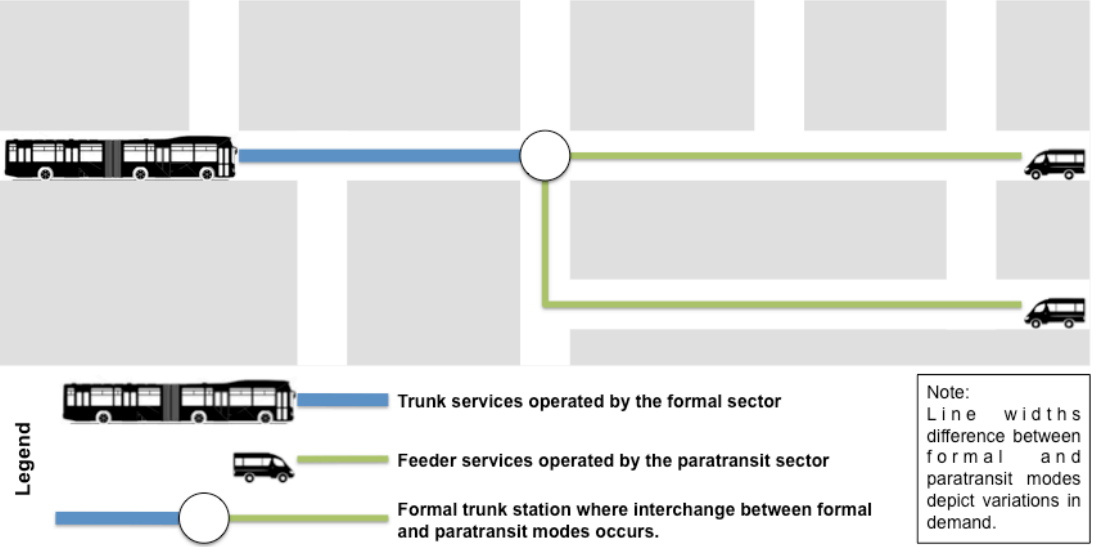
1. *Modal convergence to automated taxi service*
2. *Microtransit displaces and replaces fixed route public transport*
3. *Microtransit evolves into fixed route public transport*

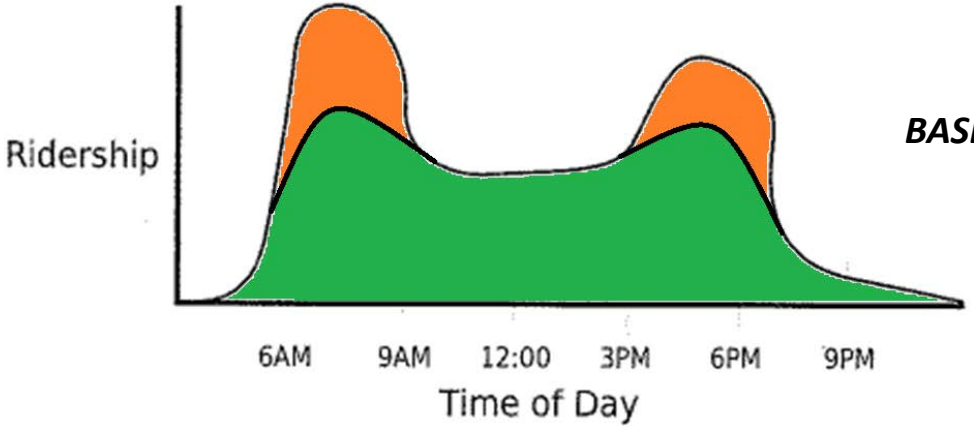
Modal efficiency framework

WONG, Y. Z., HENSHER, D. A. & MULLEY, C. 2017. Emerging transport technologies and the modal efficiency framework: A case for mobility as a service (MaaS). *15th International Conference on Competition and Ownership in Land Passenger Transport (Thredbo 15)*. Stockholm, Sweden.



Spatial and





TOP UP INTERMEDIATE MODES

BASE LOAD PUBLIC TRANSPORT

Mobility as a Service (MaaS)

"Bundles, budgets and brokers"

HENSHER, D. A. 2017. Future bus transport contracts under a mobility as a service (MaaS) regime in the digital age: Are they likely to change? *Transportation Research Part A: Policy and Practice*, 98, 86-96.

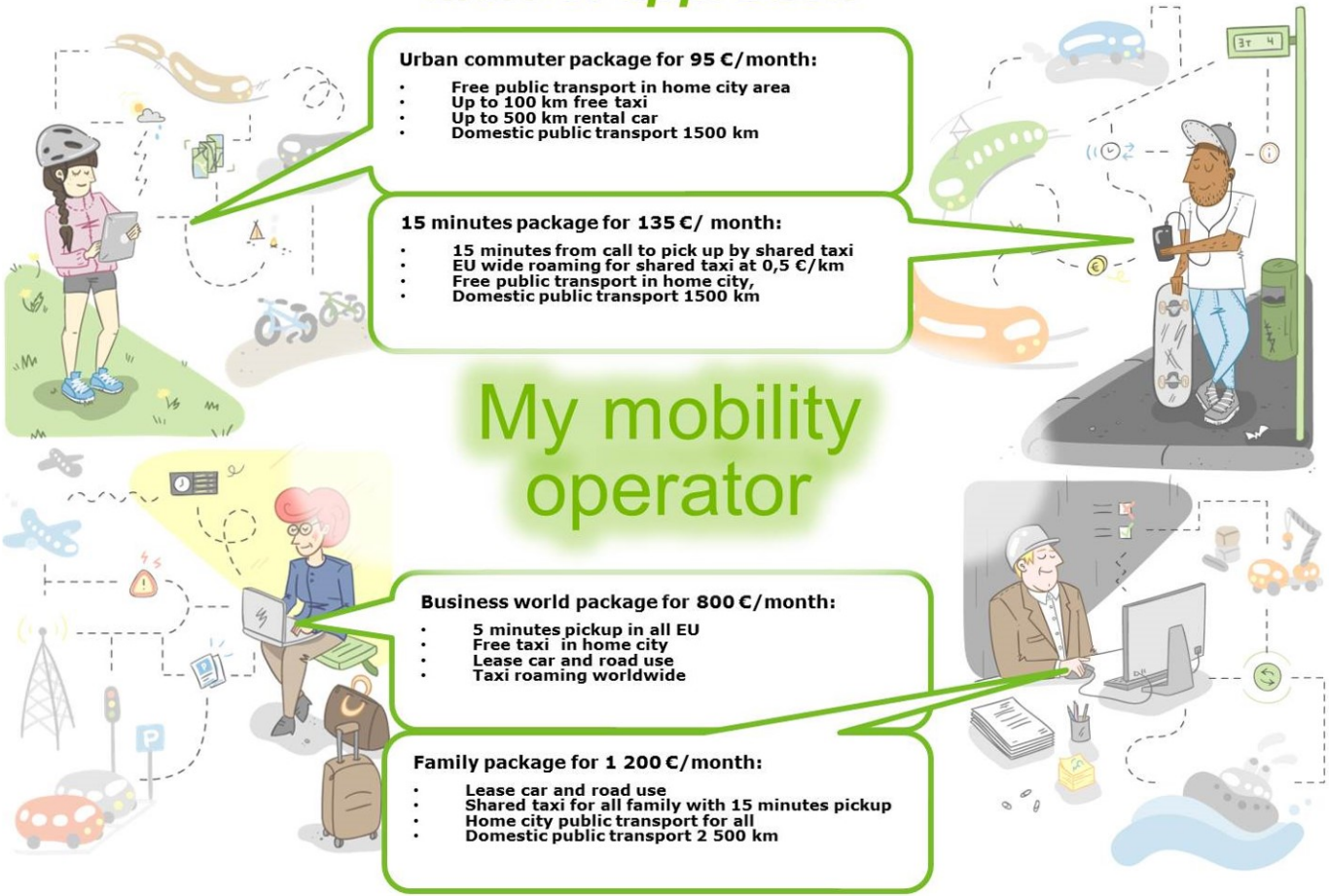
Introducing the concept

- *A personalised, one-stop travel management platform digitally unifying trip creation, purchase and delivery*

- User, provider and societal benefits
- Major players brought together diverse stakeholders

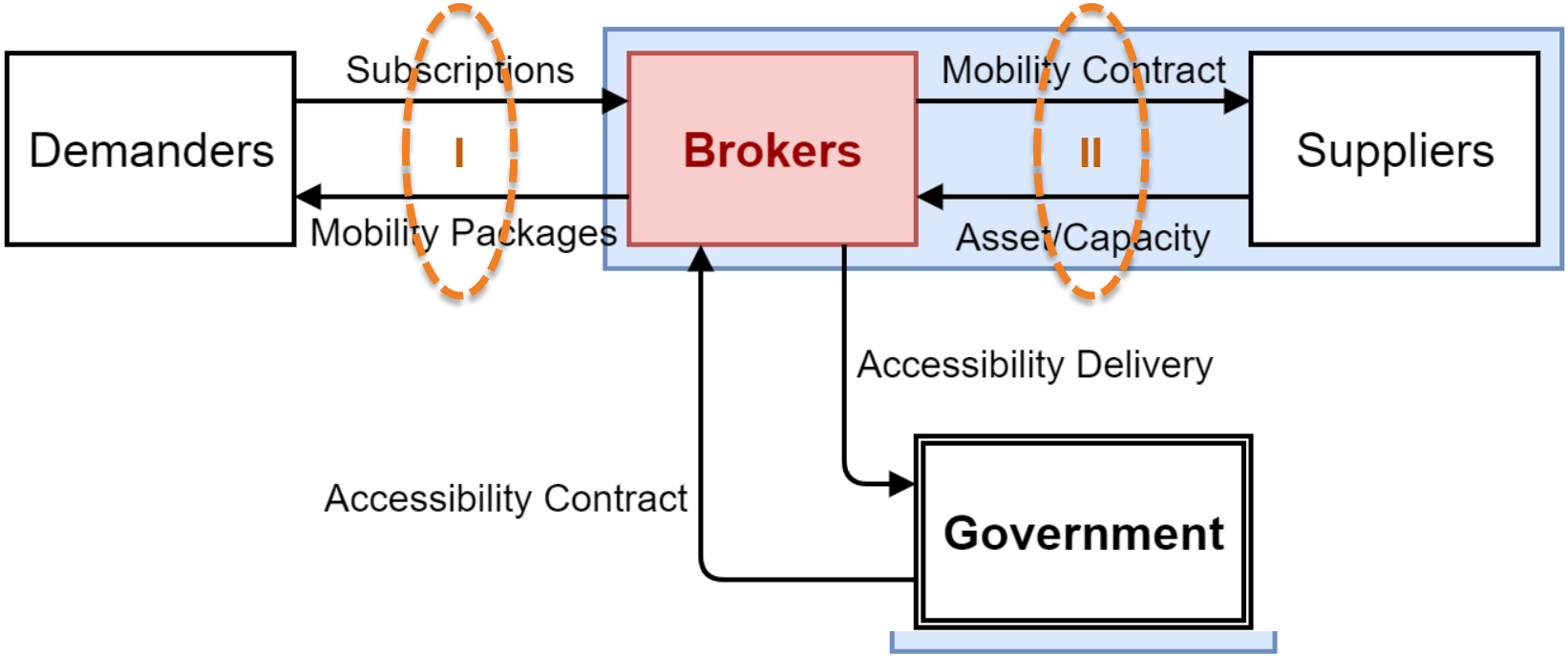
- **"Bundles":** Mobility packages representing bundles of mobility
- **"Budgets":** End user preferences and service provision possibilities
- **"Brokers":** New entrepreneurial model providing aggregating function

Mobility as a Service enables new market approach



MaaS ecosystem

C: Mobility as a service under government contracting



Service Delivery Reform

Future of transport contracts

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Mobility contracts: *The supplier-broker interface*

- Design informed by in-depth interviews with MaaS operators and regulators, plus participatory research at Thredbo 15 Workshop 7
- *International Conference Series on Competition and Ownership in Land Passenger Transport* (Next conference in Singapore, August 2019)
  - Pre-empted where government has moved in terms of institutional reform, contract design and implementation


POD
POD


RIDE
plus
RIDE


BRIDJ
BRIDJ
IVECO
IVECO


our
bus


On Demand
Interline


BCI

Transport for Newcastle

Keolis Downer

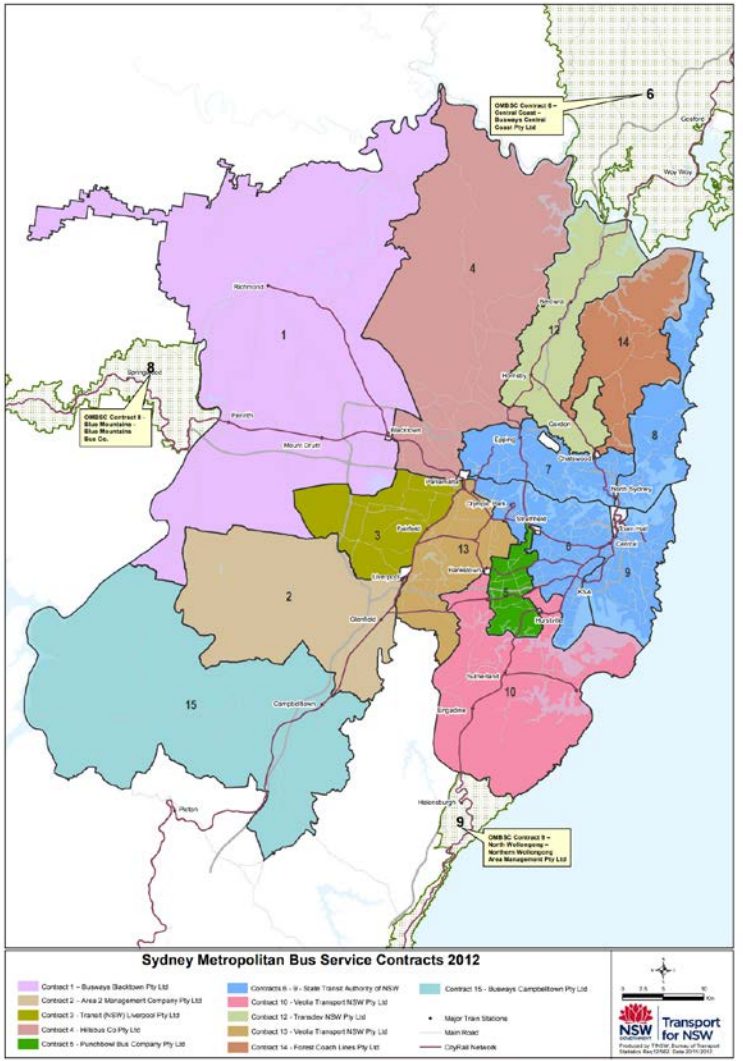
SMBSC Region 6

TRANSIT SYSTEMS

Melbourne access contracts

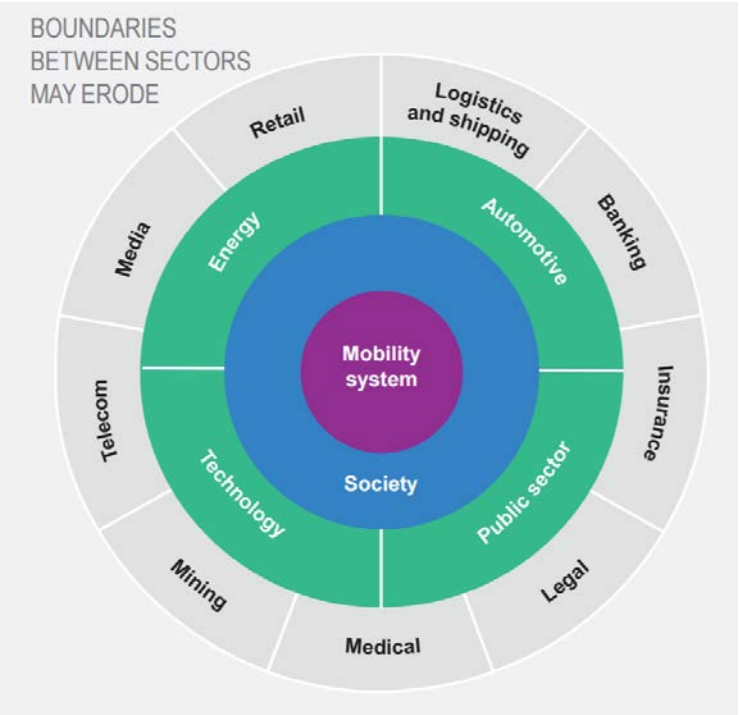
Future of bus contracts

- Present:
  - Area-specific
  - Output-based
  - Deliver **kilometres** on defined vehicle types
- Future:
  - Mode-agnostic
  - Outcome-based
  - Deliver **accessibility** using any vehicle of choice



New players in the mobility sector

- Vehicle manufacturer/suppliers
- Technology provider/startups
- Financial enterprises
- Infrastructure operators
- Property developers
- Telecommunication providers
- Consultancies
- Insurance companies
- Industry bodies



Supplier Survey

Experimental design

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WONG, Y. Z., HENSHER, D. A. & MULLEY, C. 2018. Mode-agnostic mobility contacts: Identifying broker/aggregator models for delivering mobility as a service (MaaS) [Part I: Experimental Design]. *40th Australasian Transport Research Forum (ATRF)*. Darwin, Australia.

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Business Opportunities in Future Mobility

Introduction

New technologies and business models are rapidly transforming the way in which passenger transport services are being provided. In a number of countries, we are seeing new types of services being offered, such as Uber, and packaging through a smart application the opportunity to access a range of transport modes. An important feature of the way in which the future will deliver transport services is identifying new business models where organisations can either invest in or run multimodal services. This survey is designed to elicit your views on how businesses may or may not participate in these future entrepreneurial opportunities.

This study is being undertaken by researchers at the University of Sydney's Institute of Transport and Logistics Studies (ITLS). The survey should take approximately 15-20 minutes to complete. Information collected is strictly confidential and the results of the survey will be reported in such a way that you *will not* be individually identifiable. You can withdraw from the study at any time by simply closing your internet browser.

If you would like further information about the survey, please consult the Participant Information Statement or contact Yale Wong. If you have any concerns or complaints about the conduct of this research study, please contact the Human Ethics Manager at the University of Sydney. Please quote the study title and protocol number (2017/1020).

By clicking on the button below to begin the survey you acknowledge that you have read this page and agree to participate in this voluntary survey.

Next

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Business Opportunities in Future Mobility

Your organisation — Metro

Please answer some additional organisation-specific questions.

To what extent do you agree with the following statements?

Please select one answer per row.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Metro is **making money** on our present contract(s)/operations.	○	○	○	○	○
Metro is generating a sufficient **return on investment** on our present contract(s)/operations.	○	○	○	○	○
Metro has a trusting partnership with the **regulator**.	○	○	○	○	○
Metro has constructive partnerships with other **public transport operators**.	○	○	○	○	○
Metro has constructive partnerships with **transportation network companies**.	○	○	○	○	○
Metro's present routes/contracts/services contribute to the **brand** of our organisation.	○	○	○	○	○

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Opportunities in future mobility

The transport and mobility sector is rapidly evolving. New transport futures based on shared mobility and bundled offerings have been proposed, often known as **mobility as a service (MaaS)**. MaaS describes a personalised, one-stop travel management platform digitally unifying trip creation, purchase and delivery. A number of new, collaborative models have been suggested for how these services may potentially be delivered. Central to this are what we call **MOBILITY CONTRACTS** which form the interface for bringing together interested businesses as partners under a new entrepreneurial model. Each mobility contract is defined by a range of features which are explained in the example below.

Features	Explanation	Example Mobility Contract
MOBILITY OFFERING (REVENUE MIX)	The proportion of total revenue which will originate from each mode. At the extreme, this may be: • *100% indicating a sole modal offering in the mobility contract* • *0% indicating the absence of a particular mode in the mobility contract*	
Fixed route public transport	Conventional public transport including buses, light rail, trains and ferries	20%
On demand public transport	Road-based public transport without fixed routes, stops and schedules, usually operated with minibuses and other bus-based vehicles	30%
Carsharing	Short term car rental, either from a dedicated fleet, or from other members of a car club	30%
Taxi-like services	Conventional taxis and point-to-point ridehailing like UberX, that are not shared with other customers	20%
Shared ridehailing services	Shared ridehailing like UberPOOL, usually operated with cars and minivans	0%
GOVERNMENT SUPPORT		
Appeal to government through strategic/regulatory support	Non-financial support for innovative transport services like MaaS	Enthusiastic
Monetary support for fixed route public transport	Financial subsidies for fixed route public transport	No
RETURN ON INVESTMENT (FIRST FIVE YEARS)		
Expected average annual return on investment	Profit margin you can expect to receive, on average—note that the motivation to expand market share may make this negative *in the first five years*	-10%

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Expected average annual return on investment	Profit margin you can expect to receive, on average—note that the motivation to expand market share may make this negative *in the first five years*	-10%
Possible range for annual return on investment	Range in which the above profit margin figure may vary between, capturing risk and uncertainty	-12% to -8%
BUSINESS BRANDING		
MaaS business and service branding	How the new MaaS offering will be branded. In this example, the MaaS business will take on a new, non-company specific brand	New, non-Metro brand
YOUR EQUITY CONTRIBUTION		
Total value of the MaaS business	Measure for the size of the MaaS business in USD	USD 10 million
Your proportion equity and voting rights in the MaaS business	Proportion of equity you own in the whole business, reflecting your voting rights	30%
Your equity contribution to the MaaS business	**Amount in which Metro will contribute to the MaaS business. This may be in terms of a financial outlay (*invest in*) and/or assets which you provide in-kind (*supply in*), to the value of this amount**	**USD 3 million**

You will now be asked to consider a series of hypothetical mobility contracts where you will have the opportunity to:

- **Invest in** the contract, meaning Metro will become a financial shareholder only in the MaaS business; and/or
- **Supply in** the contract, meaning Metro will run the MaaS business by contributing assets like technology, vehicles, property, infrastructure or personnel

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Features	Mobility Contract 1	Mobility Contract 2	Mobility Contract 3	None of these
Mobility Offering (Revenue Mix)				
Fixed route public transport	10%	20%	0%	
On demand public transport	20%	0%	10%	
Carsharing	20%	30%	0%	
Taxi-like services	10%	0%	80%	
Shared ridehailing services	40%	50%	10%	
Government Support				
Appeal to government through strategic/regulatory support	Lukewarm	None	None	
Monetary support for fixed route public transport	Yes	No	N/A	
Return on Investment (First Five Years)				
Expected average annual return on investment	15%	-5%	10%	
Possible range for annual return on investment	7% to 23%	-7% to -3%	2% to 18%	
Business Branding				
MaaS business and service branding	New, non-Metro brand	A partner company's brand	Metro-branded	
Your Equity Contribution				
Total value of the MaaS business	USD 10 million	USD 70 million	USD 10 million	
Your proportion equity and voting rights in the MaaS business	30%	30%	60%	
Your equity contribution to the MaaS business	**USD 3 million**	**USD 21 million**	**USD 6 million**	
Q1a. Which mobility contract would Metro **most likely** choose to **INVEST IN**? *Investing means becoming a financial shareholder without contributing any assets.*	◉	○	○	○
Q2a. Which mobility contract would Metro **most likely** choose to **SUPPLY IN**? *Supplying means contributing assets to run the mobility as a service (MaaS) business.*	○	◉	○	○

Supplier Survey

Preliminary results

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WONG, Y. Z., HENSHER, D. A. & MULLEY, C. 2019. Mode-agnostic mobility contacts: Identifying broker/aggregator models for delivering mobility as a service (MaaS) [Part II: Model Estimation]. *Transportation Research Board (TRB) 98th Annual Meeting*. Washington, D.C., United States. Manuscript in preparation.

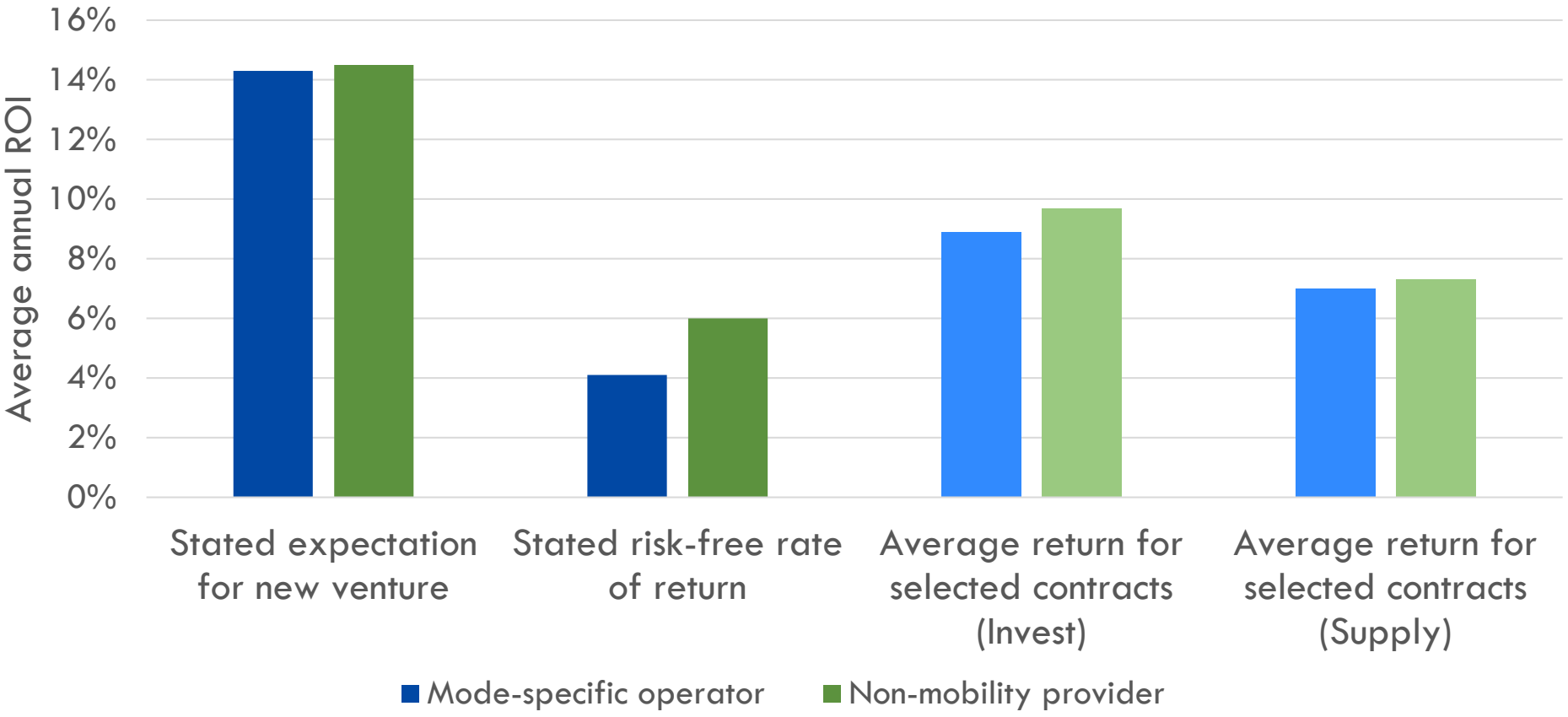
Respondent sample

Jurisdiction	Mode-specific operator				Non-mobility provider				Grand Total
	Small	Medium	Large	*Total*	Small	Medium	Large	*Total*	
Australia	24	6	1	*31*	17	*7*	3	*27*	**58**
New Zealand	1	1		*2*					**2**
Hong Kong		1	1	*2*	3			*3*	**5**
China			1	*1*			1	*1*	**2**
Singapore	2	2	1	*5*		1		*1*	**6**
Japan							3	*3*	**3**
United Kingdom	1	1	1	*3*	3	1		*4*	**7**
Continental Europe					6	0	*5*	*11*	**11**
United States	1	3	1	*5*	8	2	2	*12*	**17**
Canada		3		*3*		1	2	*3*	**6**
Other		2		*2*	2			*2*	**4**
Grand Total	**29**	**19**	**6**	***54***	**39**	**12**	**16**	***67***	**121**

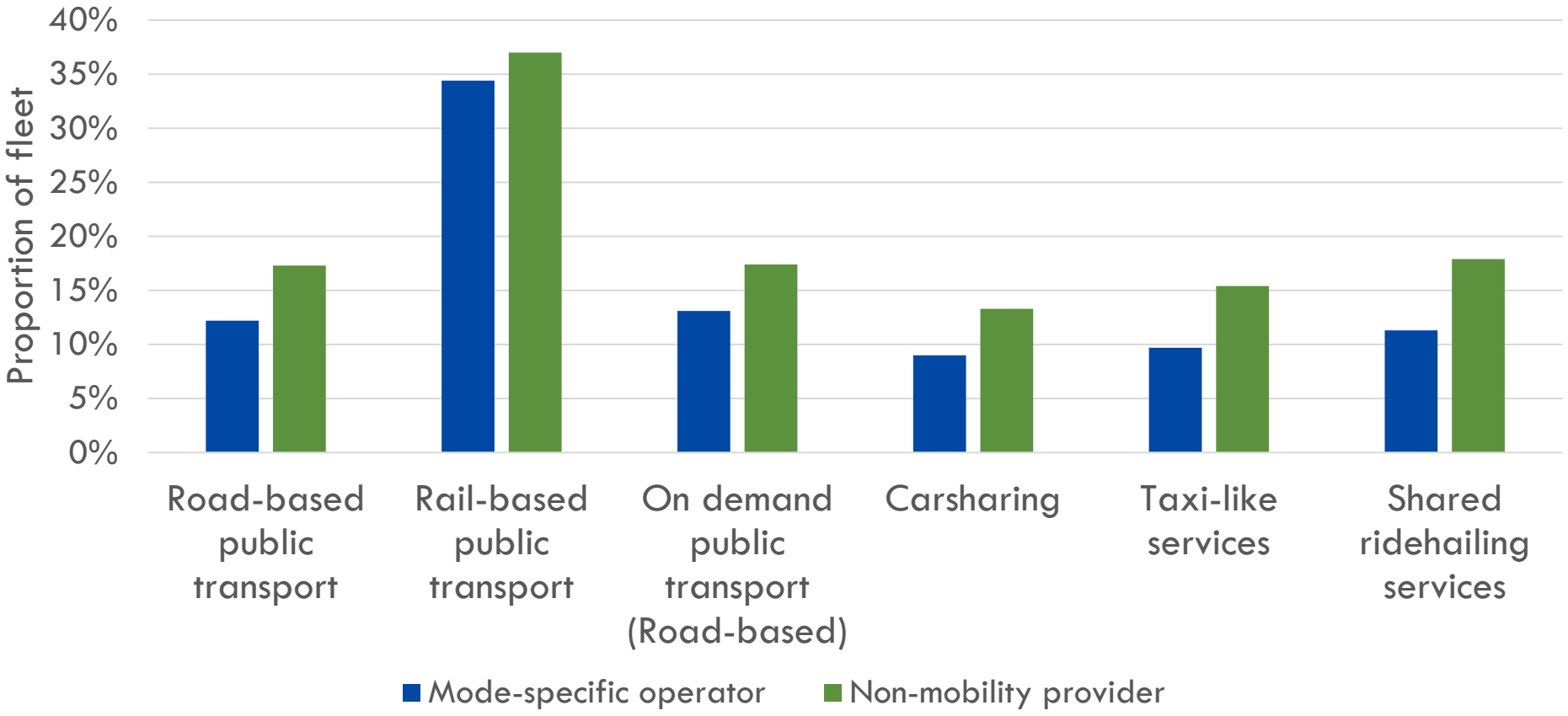
Mean attribute levels for chosen alternatives

	Willing-to-invest		Willing-to-supply	
	Mode-specific operator	**Non-mobility provider**	**Mode-specific operator**	**Non-mobility provider**
Fixed route public transport	31.9%	20.8%	34.3%	25.2%
On demand public transport	19.1%	20.9%	19.9%	19.9%
Carsharing	15.2%	18.0%	13.5%	19.3%
Taxi-like services	19.4%	17.6%	16.8%	15.1%
Shared ridehailing services	14.5%	22.7%	15.4%	20.5%
Expected average annual ROI	8.9%	9.7%	7.0%	7.3%
ROI risk/variance	±6.4%	±6.2%	±6.3%	±6.5%
Total value of MaaS business	USD 53.9 million	USD 126.5 million	USD 59.5 million	USD 124.3 million
Proportion equity and voting rights	35.9%	34.3%	37.5%	35.30%
Equity contribution to MaaS business	USD 14.8 million	USD 43.7 million	USD 20.3 million	USD 42.3 million
Sample cases	*170*	*196*	*205*	*238*

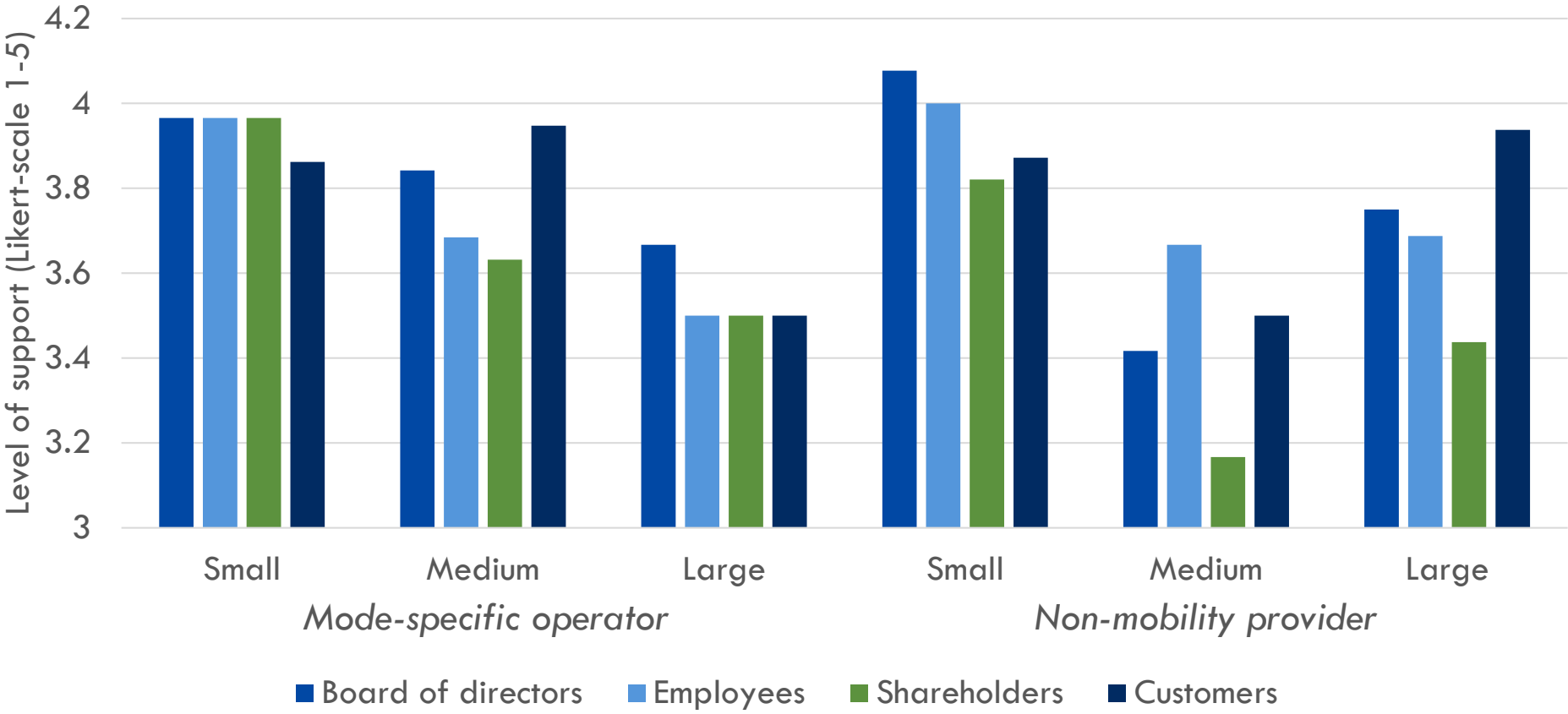
Return on investment (ROI): Expectations and acceptance



Fleet expected to be autonomous by 2028



Stakeholder support for MaaS initiatives



Model parameters (Mixed logit)

	Willing-to-invest Parameter estimates (z-score)	Willing-to-supply Parameter estimates (z-score)
Random parameters: Mean		
Fixed route public transport (%)	***	***
On demand public transport (%)	***	***
Carsharing (%)		*
Taxi-like services (%)		
Shared ridehailing services (%)	**	**
Expected average annual ROI (%)	***	***
Total value of MaaS business (USD millions)	**	*
Proportion equity and voting rights (%)		
Enthusiastic appeal to government (1/0)	**	*
Lukewarm appeal to government (1/0)		*
Fixed (non random) parameters		
ASCA	**	*
Monetary support for public transport (1/0)		*
No choice constant (Null)	**	
Mode-specific operator (For null)	**	
Medium-sized enterprise (For null)		**
Large-sized enterprise (For null)		***

No choice constant (Null)	**	
Mode-specific operator (For null)	**	
Medium-sized enterprise (For null)		**
Large-sized enterprise (For null)		***
Australian enterprise (For null)		
Random parameters: Distribution (Normal)		
Fixed route public transport (%)	***	***
On demand public transport (%) (Constrained)	***	***
Carsharing (%)	***	**
Taxi-like services (%)		***
Shared ridehailing services (%)		
Expected average annual ROI (%)	***	***
Total value of MaaS business (USD millions)	***	***
Proportion equity and voting rights (%)	***	***
Enthusiastic appeal to government (1/0)	***	***
Lukewarm appeal to government (1/0)	***	
Model fit		
Log-likelihood at zero	-670.96647	-670.96647
Log-likelihood at convergence	-531.50862	-506.48087
McFadden Pseudo R-squared	0.2078462	0.2451473
AIC (Sample adjusted)	2.304	2.2

Mixed logit (random parameters) model based on 484 observations from 121 respondents

****, **, * ==> Significance at 1%, 5%, 10% level*

Willingness-to-pay (WTP) for contract elements

Willingness-to-pay estimates	To invest (USD million)	To supply (USD million)
1% additional fixed route public transport revenue	11.8	13.8
1% additional on demand public transport revenue	8.2	4.5
1% additional carsharing revenue	2.6	3.0
1% additional taxi-like services revenue	3.5	-1.5
1% additional shared ridehailing services revenue	5.9	4.6
Presence of government subsidy	-303.3	-385.1
Lukewarm appeal to government	-21.6	118.3
Enthusiastic appeal to government	260.9	170.0
1% additional return on investment	41.8	20.3
1% additional equity contribution	0.7	-1.4

Example mobility contracts and pricing

	Mobility contract			
	1	**2**	**3**	**4**
Fixed route public transport	31.9%	20.8%	34.3%	25.2%
On demand public transport	19.1%	20.9%	19.9%	19.9%
Carsharing	15.2%	18.0%	13.5%	19.3%
Taxi-like services	19.4%	17.6%	16.8%	15.1%
Shared ridehailing services	14.5%	22.7%	15.4%	20.5%
Expected average annual ROI	8.9%	9.7%	7.0%	7.3%
Business value to invest (USD million)	**1,123.16**	**1,088.62**	**1,045.28**	**989.66**
Business value to supply (USD million)	***790.04***	***710.02***	***791.13***	***715.05***

Key findings (Preliminary)

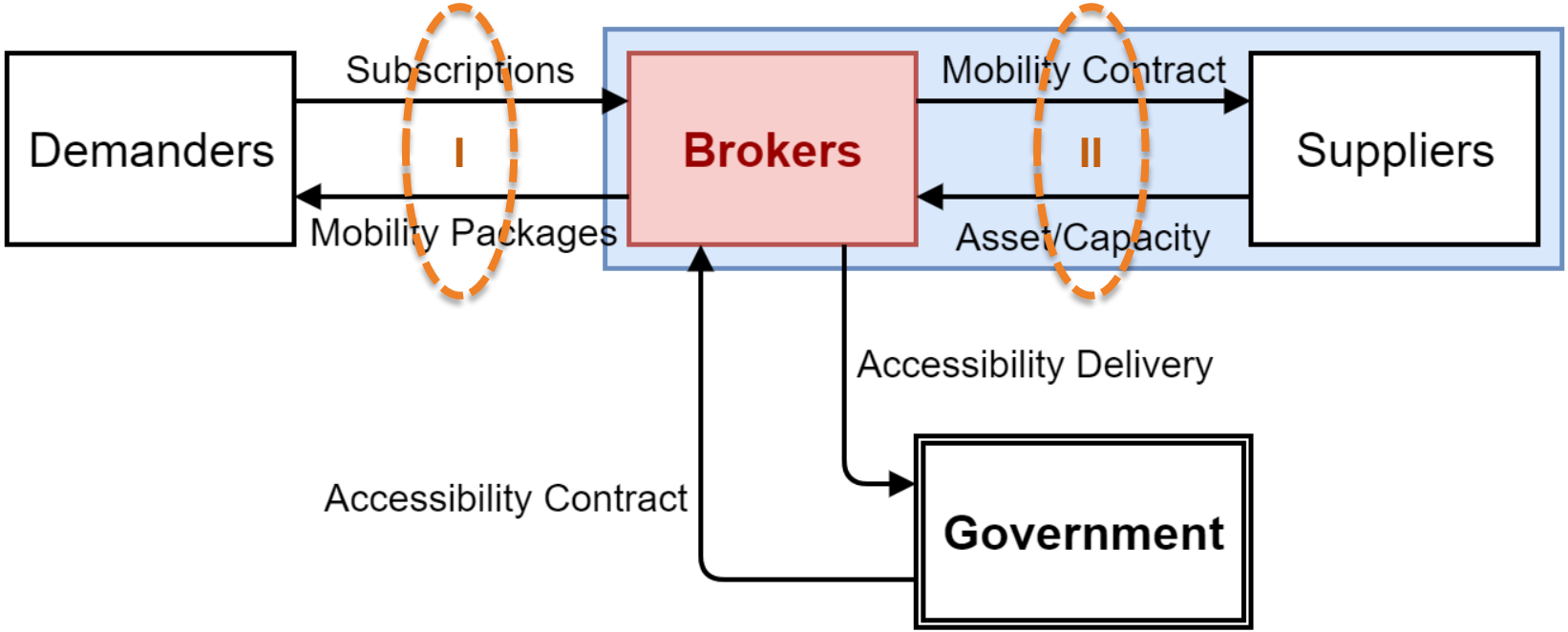
- Major differences between mode-specific and non-mobility respondents
- Public transport an important component to gain business support
- Prefer government involvement **at arm's length**
- ROI less than expectation is acceptable (but greater than risk-free rate)
- Variance in return not significant
- Branding not significant
- Willing to work with partners (not monopolise): ~35% of business equity
- Greater support amongst small (employees <1000) than larger enterprises

We still need more contacts from industry: Senior executives making investment decisions in both transport and non-mobility businesses.

Please speak to me if you can assist.

MaaS ecosystem

C: Mobility as a service under government contracting



Next steps

Demander-broker interface

- Bundles and budgets
- End user preference and trade-off between mobility package attributes

Broker-supplier interface

- Commercial interest in delivering mobility services
- Mobility contracts for supplier buy-in and investment

- Combine demand plus supply results to determine **market-led equilibrium**
- Government can then evaluate if acceptable and add an **institutional overlay** where necessary consistent with urban efficiency goals of cities

Relevant publications

- BRAY, D., HENSHER, D. A. & WONG, Y. Z. 2018. Thredbo at thirty: Review of papers and reflections. *In* Alexandersson, G., Hensher, D. A., & Steel, R. (Eds.), Competition and Ownership in Land Passenger Transport (Selected papers from the Thredbo 15 conference). *Research in Transportation Economics*. In press, corrected proof.
- HENSHER, D. A. 2017. Future bus transport contracts under a mobility as a service (MaaS) regime in the digital age: Are they likely to change? *Transportation Research Part A: Policy and Practice*, 98, 86-96. https://doi.org/10.1016/j.tra.2017.02.006
- HENSHER, D. A. 2018. Tackling road congestion—What might it look like in the future under a collaborative and connected mobility model? *Transport Policy*, 66, A1-A8. https://doi.org/10.1016/j.tranpol.2018.02.007
- HO, C., HENSHER, D. A., MULLEY, C. & WONG, Y. Z. 2018. Potential uptake and willingness-to-pay for mobility as a service (MaaS)—A stated choice study. *Transportation Research Part A: Policy and Practice*. In press, corrected proof.
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The MaaS Journey: Rationale and Service Delivery

ITLS MaaS Briefing Seminar

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Yale Zhuxiao Wong

Institute of Transport and Logistics Studies

University of Sydney Business School

yale.wong@sydney.edu.au

Supervisors: Prof David A Hensher

Prof Corinne Mulley

THE UNIVERSITY OF SYDNEY

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