

Mobility as a Service (MaaS): What does it mean for the NSW bus & coach industry?

**Guest feature by Yale Z Wong,
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Mobility as a service (MaaS) is a popular interpretation of future collaborative and connected urban transportation, centred on a changing society embracing a sharing culture which can satisfy our mobility needs without owning assets such as a car. MaaS emerges because of opportunities afforded by



digital information platforms to plan and deliver multi-modal mobility options in point-to-point trips and/or first-and-last mile travel to public transport journeys. MaaS packages will provide consumers with seamless mobility options with integrated payments through a single application in much the same way as unified mobile plans provide users with a choice of calls, text and data options.

Led by Professor David Hensher, the Institute of Transport and Logistics Studies (ITLS) at the University of Sydney Business School has worked closely with the bus and coach industry through individual operators and state and national associations since 1987. Key facets of research in this sector include cost and efficiency benchmarking, contract design and institutional reform, travel behaviour including choice between bus and rail modes, as well as the impacts of digitalisation and intelligent mobility.

In this feature, we examine how bus operators are responding to new entrants in the passenger mobility market and on demand initiatives led by government. We explore the MaaS concept and share some of our own research around consumer preferences and emerging service delivery models including the likely future of bus contracts. We conclude with our view on how the urban passenger transport landscape might evolve longer term, and the associated opportunities and realities for the bus and coach industry.

THE STATE OF PLAY

New Mobility Entrants

The emerging transport paradigm is being shaped by a number of forces front and centre of which are new entrants in the passenger mobility market. Loosely dubbed **transportation**



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network companies (TNCs), these shared mobility providers offer carsharing, ridesharing and bikesharing under a variety of models. As of May 2018, there are 35 (and rapidly growing) active players in the Australian market (Figure 1)—all rarely profitable and supported by aggressive venture capital investors. Beyond these service providers, a host of related businesses (both startups as well as new ventures by multinationals) in the data business and as technology suppliers (building digital platforms and the like) have also spurned operating in the business-to-consumer, business-to-business and business-to-government spaces.

Major Australian players in the rideshare sector (aided by NSW government Point-to-Point reforms) include the homegrown GoCatch, infamous Uber, and recent new additions Estonia's Taxify, India's Ola and (soon to be) China's Didi Chuxing. What might be less recognised is that the puppet master behind the entire ridesharing industry is Japan's SoftBank (its most successful investment being China's Alibaba). SoftBank is the largest single shareholder in most ridesharing companies (including 15% of Uber) and has indeed pushed the company to retreat from many markets, recently selling its South East Asian business to Grab, following its exit from China in 2016 (competitors all being SoftBank-backed ventures), leaving India and Brazil as the next key battlegrounds.

In amidst big deals and big money is the question of how TNCs are interacting with conventional public transport providers and their impacts on travel behaviour and the broader urban realm. Evidence from the US shows ridesharing both competing and complementing traditional public transport, depending on market and demographic. There is also increasing evidence that TNCs are contributing to rising congestion in the urban core. However, little empirical data have been made available locally to draw conclusions in the Australian context.

An interesting question is why there are such few instances of collaboration between incumbent bus and rail operators and these new shared mobility players. In the US, there exists a number of cases of local governments and public transport operators cooperating with TNCs to provide integrated service, particularly in providing first/last mile connections. There are no such examples in Australia, with the sole exception being Canberra's **Night Rider+Uber** initiative. In this instance, the ACT government has withdrawn their demand-responsive late-night buses from the suburbs and replaced them with more frequent service on their trunk (Rapid) network. Using promotional codes, customers benefit from a \$10 discount off their Uber connection from a public Night Ride service—of which the government contributes \$5 with Uber subsidising the other \$5. Taxi operators have lost out (despite being initially approached for this partnership) and evidence points to Uber driver-partners making better money from higher passenger turnover and shorter trips.

So why have we not seen more of these joint initiatives? There seems to be elements of suspicion, mistrust and territorialism amongst the incumbents' view of (and even between) TNCs. The

choice by Uber to compete head-on with brick and mortar players in every conceivable market (often whilst roadblocked by local authorities) certainly did not help its reputation, although many say this attitude is rapidly changing as a result of recent controversies and new leadership. Whilst their initial (understood) objective was to replace public transport, their tone these days is far more conciliatory wanting to cooperate and work with government agencies and public transport operators. Issues in power dynamics remain, however, particularly around the control of branding, the customer and data—not well suited to private industry who also hold these dearly. The Canberra exception with its public operator may show the necessity for government intervention to foster collaborative efforts, as supported by the development of government-led on demand trials in NSW.

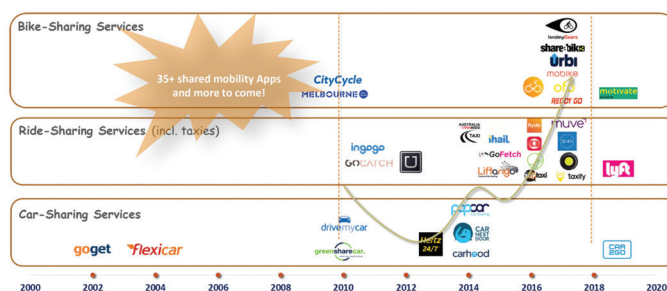


Figure 1: Shared mobility providers in Australia—the vast majority of which have entered over the past three years¹

¹Eldaly, H. and von Hessberg, C. (2018). *Mobility as service—The state of play. Presented at the Intelligent Transport Systems Australia (ITSA) Mobility as a Service 2018 conference, Sydney, Australia.*

On Demand Developments

Many jurisdictions look to NSW and Sydney for government-led innovation in the passenger transport space. The **Future Transport** agenda embarked by the NSW government has now evolved into a strategic vision that is the 2056 Roadmap, which showcases (amongst other things) the role MaaS might play in the future. Importantly, Transport for NSW has followed through its 2016 Summit with demonstrated commitments and funding, including through on demand trials (Figure 2) in Metropolitan Sydney, Outer Metropolitan and soon to be Rural and Regional NSW.

NSW bus operators have responded enthusiastically, working in conjunction with technology providers like Via, Routematch and TaxiCallr (though some have developed in-house products) to deliver some very innovative service offerings. Despite initially involving larger players like Uber, these proposals have not proceeded. Each pilot varies in implementation, fare structures and operations which will allow government and industry to test what works and what does not. The recent Rural and Regional on demand offering received over 70 expressions of interest from NSW operators, though the question remains whether these operators genuinely believe in the concept (as

many don't), or are simply in the game to impress Transport for NSW (given their interest in on demand) to aid their next round of contract renewal. Some operators are even developing their own on demand products independent of government though none have thus far been launched.



Figure 2: A selection of on demand pilots operating in Greater Sydney. Clockwise from top left, Punchbowl Bus Company's Punchbowl On Demand (POD), Transdev's Ride Plus, Transit System's BRIDJ, ComfortDelGro's OurBus, Interline Bus Services' Interline Connect and Keolis Downer's Newcastle Transport On Demand.

Little data has been shared thus far on the performance of on demand despite Minister Constance hailing NSW as the most successful take up of on demand in the world, pointing to patronage figures in excess of **3,000 passengers a day**, with 40,000 carried since the program's launch. However, some vital questions remain unanswered including what proportion are repeat customers, whether they are shifting from existing public bus services or from the private car, what the impacts are on existing bus patronage, and whether there are potential cost savings to replace fixed route buses with on demand services. We also need to know the impacts of a lack of fare/ticketing integration and fragmentation of the user base in the current implementation model which may be more difficult to test.

What on demand operators have shared is that far more people are using cash than expected, and also booking via their telephone interface, due to (at least initially) confidence issues around use of the service. The most successful systems to date have hence been those with a human element complementing the technological interface with the customer. To date, marketing efforts have also been poor, with many customers knowing about the service only after seeing the vehicles out on the road. It will be interesting to observe how many of these services are continued beyond their present pilot phase, and how they will integrate with (and displace) existing bus services in the future.

The Rural and Regional round also throws up the question of scalability for the on demand proposition. One point of reference is the ArrivaClick service (based on Via's platform) in the town of Sittingbourne (Kent) in south east UK (population 60,000). The service enjoys higher utilisation per vehicle than Via's product in New York City, as it quickly became the best option in town with the residents feeling a strong sense of ownership towards the

service and using it for a host of trip purposes. It remains to be seen whether this level of success can be replicated in Australia.

PREMISE FOR MAAS AND ITS ECOSYSTEM

The premise for the MaaS concept is to transform mobility based on asset ownership (usually, in the form of a private vehicle) to one where it may be consumed as a *service*. Whilst conventional public transport already exists as a service, the reality in Australian cities is that it cannot serve adequately all trip purposes at all trip times. Spatially, public transport is geared towards radial trips into the CBD and temporally during journey to work hours (where sufficient scale exists—the essence of mass transit in bringing many people onto a single vehicle). As such, public transport mode share remains low in Australian cities, let alone in rural and regional towns. With the advent of TNCs, the idea is that public transport complemented with these shared mobility services (carsharing, ridesharing and bikesharing) can offer service on par and exceeding that of vehicle ownership. Various MaaS schemes have already been trialled around Europe for several years (e.g., UbiGo in Gothenburg and Whim in Helsinki).

The challenge in integrating public transport and shared mobility services are manifold. Firstly, an interconnected payment method is necessary, as well as an integrated journey planning algorithm. Whilst these exist as technological requirements, more challenging perhaps are institutional issues surrounding government regulation and strategic support, as well as business collaboration, memoranda of understanding and contracts between various parties concerning revenue sharing, branding and control of the customer. Many of these issues can only be determined having understood what consumers demand.

If realised, the MaaS concept promises benefits for all stakeholders. For customers, it provides a one-stop shop experience in transportation which is available already in other utility markets like water and electricity. Depending on individual circumstance, MaaS will likely save consumers money as compared with private vehicle ownership, where many costs like purchase, depreciation (and even maintenance) are generally perceived to be 'sunk', let alone the costs imposed on society borne by us all. For transport operators, MaaS exists as a new opportunity to expand market share (but also at the risk of being consumed by other players). For government, MaaS offers the potential to reduce subsidy on existing contracted services (especially for buses). These opportunities exist in two dimensions:

- **Spatially**, MaaS can integrate on demand services in marginal environments (e.g., outer suburbs experiencing poor patronage) with successful mass transit corridors. First/last mile travel to railway stations is a particular opportunity given parking constraints. Challenges remain in meeting school travel demand, however.

- **Temporally**, TNCs can supplement peak services, thus outsourcing the most expensive service by reducing peak vehicle requirements (a model rarely described). Experience from South Africa (minibus taxi and formal bus integration) shows the opportunity to reduce vehicle requirements by 40% on a single corridor.

At ITLS, we have developed a framework surrounding the ecosystem for MaaS (Figure 3)². Central to this are what we call mobility **brokers/aggregators** who bring together specialised businesses and value add by offering that integrating function. They purchase the transport asset/capacity from **transport suppliers**, including from bus and coach operators, then bundle these as mobility products for subscribers. Opportunities exist for suppliers to also take on this broker role, hence the blue box in our diagram (or they may be new entrants). We believe transport operators, platform providers and financial enterprises are crucial entities in the broker business model. Government will then alter its relationship with industry given this new mobility focus, including by reforming existing public transport contracts. Key concepts (shown by linkages) under our framework include:

- **Mobility packages:** Pay-as-you-go (PAYG) plans or subscription-based packages which bundle together various entitlements and grant customers a defined volume of access to each mode, similar to mobile plans which combine calls, text and data options (examples in Figure 4)
- **Mobility contracts:** Interface for bringing together interested businesses as partners under a new entrepreneurial model for delivering MaaS (the mobility broker/aggregator)

Over the past two years, the team at ITLS has been using advanced modelling techniques to elucidate consumer

and business preferences to design these bundled mobility packages and mode-agnostic mobility contracts. We now share some of our findings in turn.

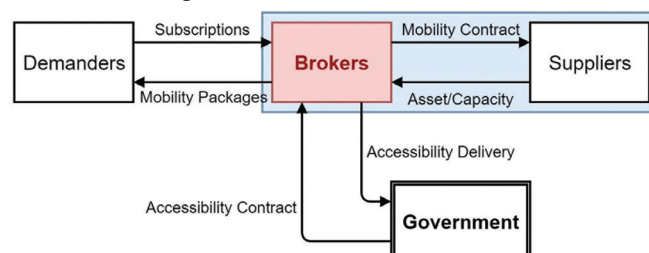


Figure 3: Our proposed framework for the MaaS ecosystem, comprising the new function for a mobility broker aggregating different suppliers and delivering integrated service to demanders (Wong, Hensher and Mulley, 2017)

²Wong, Y. Z., Hensher, D. A., and Mulley, C. (2017). Emerging transport technologies and the modal efficiency framework: A case for mobility as a service (MaaS). Paper presented at the 15th International Conference on Competition and Ownership in Land Passenger Transport (Thredbo 15), Stockholm, Sweden.

UNDERSTANDING THE MARKET FOR MAAS

In 2017, ITLS conducted Australia's first stated choice study on consumer preferences for MaaS packages to find the likely market for MaaS and the design and pricing strategies for MaaS packages most likely to succeed in the market.³ Our team designed a sophisticated survey instrument which was tested in the Sydney metropolitan area by a group of specialised interviewers. Each interview took around 20 minutes to complete and began with a short video explaining the MaaS concept, followed by capturing respondents' socioeconomic characteristics and present travel behaviour. In doing, we presented MaaS packages (Figure 4) which were tailored to the



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travel requirements of each respondent, to accurately reflect their present travel behaviour. Both PAYG and subscription plans were tested, as well as the opportunity for the public to design their own mobility plan. We also asked how their subscription preferences might affect their use of public transport, including in first/last mile scenarios.

Your Current Travel Record \$345 /fortnight	Plan A \$195 /fortnight	Plan B \$190 /fortnight	Pay-As-You-Go Plan \$25 /fortnight
22 trips 8 days 12 hours, 300 km over 8 days Full fare Full fare N/A	Unlimited trips 8 days 13 hours (10 hours = 1 day) + 15min advance booking + one-way car sharing 20% discount 10% discount Unused credits will be lost (use it or lose it)	Unlimited trips 14 days 11 hours (10 hours = 1 day) + 60min advance booking + round-trip car sharing 10% discount 20% discount Unused credits will roll- over to next period	Pay as you go \$6/hour + 40c/km capped at \$60/day + 30min advance booking + one-way car sharing 20% discount 20% discount Pay-As-You-Go
<input type="radio"/> I'll continue doing what I'm doing	<input checked="" type="radio"/> I'll buy this plan	<input type="radio"/> I'll buy this plan	<input type="radio"/> I'll buy this plan

Figure 4: Individually tailored mobility packages tested in our ITLS research (Ho, Hensher, Mulley and Wong, 2018). Each MaaS plan was defined by a number of entitlements, including the quantity of public transport and carshare, as well as discounts on the use of taxi and uberPOOL. We also tested whether credit rollover between each subscription period (fortnight) was important. The Current Travel Record refers to the respondent's present travel behaviour—noting that it is usually far more expensive due to the (often hidden) costs of vehicle ownership

⁹Ho, C., Hensher, D. A., Mulley, C. and 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.

Our experiment yielded a number of innovative results. Firstly, we found that MaaS is most attractive to infrequent car users (those driving 1-2 days a week), over non-users (i.e., sole public transport users) and regular car users (3-7 days). This confirms the notion that people are reluctant to purchase expensive assets such as a car which they use on occasions only. Based on this finding, we should target (at least initially) people who use public transport for travel to work and drive solely on weekends, shifting weekend travel to carsharing as part of an integrated product. We should also aim to attract families away from that second car as part of the initial phase. On average, though, we found that **47% will subscribe** to MaaS (given the packages assessed), indicating still a large proportion of people who are ingrained in their present travel behaviour.

Our research also found subscription plans to be far more attractive than PAYG products due to the quantity discounts on offer, and also that there was little interest in consumers designing their own plans (perhaps a result of the tailored nature of our offerings). We also estimated willingness-to-pay for various entitlements within MaaS packages (Table 1). Clearly, they show the prices the public is prepared to pay to be far less than their present cost, and this is especially the case with the present Opal day cap for public transport fares. As extensions to our research, ITLS is now working with our global network of partners applying the same methodology

to test MaaS in other markets including Newcastle upon Tyne in the UK and also market testing MaaS bundles at a familial unit where travel credit can be shared between members of a household.

MaaS component	WTP (\$/fortnight)
An hour access to car-share	\$6.39
A full day access to car-share (10 hours)	\$63.85
One-way car-share	\$7.27
Round trip car-share	\$0.00
Every 15 minutes increase in advance booking time	-\$1.06
A day of unlimited PT use	\$5.92
10% discount to every taxi bill	\$3.68
10% discount to every ride-sharing bill	\$7.18

Table 1: Willingness-to-pay for mobility entitlements based on a sample of 252 respondents (Ho, Hensher, Mulley and Wong, 2018). These prices can be used as inputs for designing MaaS packages attractive to the public

FUTURE OF BUS CONTRACTS

Having knowledge of what the public demands, we now turn to what the business community is willing to deliver. There exists various models for how MaaS might run including in economically deregulated contexts or as part of government-tendered contracts. In the interim phase, there may be elements of both as already there are signs of government interest in trials but also businesses (including bus operators) developing their own products independent of government. In the latter case, there are no issues in using contracted assets (i.e., buses) to provide these services (akin to existing charter operations), but challenges remain in the use of third-party ticketing systems on contracted services. Opportunities exist through OpalPay, however, to integrate the payment mechanism (recently launched on private ferries).

In terms of government-led MaaS schemes, the NSW government has launched a **MaaS Innovation Challenge** as part of its Digital Accelerator and Sydney Startup Hub—both Future Transport 2056 initiatives. Proposals are likely to sit independently of existing services, although the government has demonstrated an appetite for reform to incorporate MaaS-type services within existing contractual frameworks. Already, the multi-modal contract awarded in Newcastle is a national first in bringing together buses, ferries and light rail under a single servicing offering, and providing a private entity the opportunity to plan services, underwritten by a minimum service level guarantee. Sydney's Region 6 is also a national first to integrate fixed route buses with on demand services, and the particular bid which won out was the *most* radical in terms of what it would deliver in the service mix between fixed route and on demand (as well as saving the most money). In Melbourne, there is interest

from the rail operator (the same consortium to run Sydney Metro) in access contracts, to incorporate TNC-led first/last mile transport offerings to train stations. These all constitute initial steps on the journey towards fully-fledged MaaS schemes.

Whilst present contracts are narrow, area-specific, output-based arrangements to deliver kilometres on defined vehicles types (i.e., buses), we believe future contracts may evolve to become broader, mode-agnostic, outcome-based mobility contract offerings where a broker/aggregator has the flexibility to deliver *accessibility* using any vehicle of their choosing. Clearly, margins will vary between modes, but it is in this context where opportunities exist for the MaaS operator to internally cross-subsidise between modes by breeding complementarity and deploying the type of service most appropriate for each market.

This idea is a major theme in a conference series ITLS has run for the past 30 years. **The Thredbo series** is the world's premier international conference on competition and ownership and it is extraordinary to chart how public transport contracting has evolved during this time.⁴ In many cases, we have actually pre-empted where governments have moved in terms of the design and specification of contracts and their broader procurement mechanisms. In 2017, we held Thredbo 15 in Stockholm (Figure 5) where the 'uberisation' of public transport and MaaS became a hot topic and we brought together industry stakeholders around the world to workshop the nature of reforms in this space. Participants including regulators, operators and academics helped inform the design of what we call mode-agnostic mobility contracts which we have now taken into the market to test.



Figure 5: The 15th International Conference on Competition and Ownership in Land Passenger Transport (Thredbo 15) participants at Stockholm last year. Thredbo 16 will be held in August 2019 in Singapore—we invite the NSW bus and coach industry to join our unique policy forum on institutional and contracting reform

⁴Wong, Y. Z. and Hensher, D. A. (2018). The Thredbo story: A journey of competition and ownership in land passenger transport. 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. <https://doi.org/10.1016/j.retrec.2018.04.003>

MODE-AGNOSTIC MOBILITY CONTRACTS

We have recently launched a global business survey to test mobility contracts which form the service delivery mechanism for MaaS.⁵ This is cutting edge research and the first instance we are aware of globally to test empirically and quantitatively these new service delivery models. Our survey is designed to elicit business views and to understand the conditions around which organisations may or may not participate in the new future entrepreneurial opportunity that is the mobility broker/aggregator. We test how the modal mix, risk and return, business size and equity contribution, branding and government support might influence respondents' propensity to either *supply* or *invest* into these new businesses. The difference herein lies between contributing physical assets and assets in-kind (e.g., buses, depots, personnel) or becoming solely a financial shareholder in the broker business.

Data is being collected across five continents with a focus on jurisdictions with comparable views on risk and investment, and the sample includes service providers like public transport operators, taxi operators and TNCs, as well as non-mobility suppliers like vehicle manufacturers, technology providers, financial enterprises, infrastructure operators, property developers, telecommunications providers and more. ITLS has engaged BusNSW to assist with outreach for respondents, and we continue to welcome input from all stakeholders across the industry in our research.

Early results are very promising and indicate that public transport must be a crucial component of the MaaS product mix to gain sufficient industry support. We also note a preference for smaller business investments, linked to risk attitude and their likelihood of success. Our ultimate agenda is to combine these results with our demand work to determine the market-led equilibrium, which we will then bring to government to evaluate whether it is consistent with broader societal goals and objectives. We believe that in the longer term MaaS offers itself as an opportunity to bring the entire transport market into equilibrium by adding an institutional overlay through a hidden road user charge, a function of time of day, geography and modal efficiency. This will optimise for network efficiency but is contingent on all users subscribing to MaaS in one form or another.

⁵Wong, Y. Z., Hensher, D. A., and Mulley, C. (2019). *Mode-agnostic mobility contracts: Identifying broker/aggregator models for delivering mobility as a service (MaaS)*. Transportation Research Board (TRB) 98th Annual Meeting, Washington, D. C., United States. Manuscript in preparation.

WHAT'S NEXT?

A number of fundamental questions remain under the MaaS model. We still lack quantitative evidence on potential cost savings for government and industry and exactly how a hybrid system of shared mobility services and fixed route public transport will look (particularly the bus network). What about school bus contracts and how they might need to be reformed? How about what we call the modal capacity shortfall in terms of how MaaS operators could provide a service level guarantee? Commercial sensitivities remain over who owns the customer, the loss of branding and control over a service provider's network. This is a particular concern for government (demonstrated in the Helsinki case with MaaS Global and their relationship with the authority HSL) and indeed an issue locally playing out between Transport for NSW and private-industry led MaaS schemes.

As connected and autonomous technologies come online, the passenger transport industry is set for even greater disruption—a recurring theme throughout this piece. Vehicle manufacturers are concerned with their dwindling customer base as the public moves towards MaaS, and every major supplier is now branching out trying to reinvent themselves as mobility providers. Car insurers are exploring new business models as definitions around liability change. Even industry bodies like RACV and NRMA are rapidly finding new sources of revenue and diversifying their business as vehicle ownership begins to decline. Finally, property developers are looking to the future of parking and bundling mobility entitlements as part of rental agreements. There are thus an increasing number of players in the mobility space although it is a rapidly expanding sector of the economy.

Beyond this, new technologies like Hyperloop (supported by Richard Branson and Elon Musk and active in Australia with a number of consultancies trying to bring the concept to market) will bring even greater disruption. Passenger drones or **electric vertical take-off and landing (eVTOL)** aircraft (prototypes are in development by Airbus, China's Ehang and Uber—see Figure 6) will bring urban transportation into the third dimension and a range of associated externalities. New regulations may be necessary permitting flight only above existing roads under a certain altitude. A major question is how ubiquitous these technologies will be and their cost to consumers—will it be for the many or the few? We are told all these ventures can operate commercially through the sale of data but how sustainable is this business model?



Figure 6: The Uber Elevate flying taxi concept, recently debuted by Uber and Embraer. The venture is now seeking three launch cities for uberAIR with demonstrator flights aiming to start in 2020 and commercial operations beginning in 2023

For the bus and coach industry, imminent developments bring enormous new business opportunities, but will also face the reality of greater competition as more and more players enter the mobility sector. It is encouraging to see many operators taking risks and pursuing opportunities to reinvent themselves from bus operators to wholesale mobility providers. Multinational operators have the resources for research and development (and indeed failure), but may be less agile in the Australian market due to their more complex business structures. Some local operators are particularly innovative, whilst many others take a “wait and see approach”. For some, however, their attitude may be that they “don’t believe” in on demand or MaaS (comfort does breed complacency), and thus becoming oblivious to the latest developments. For technology players (and witnessed at technology conventions), the blind dogma often goes the other way—fervent enthusiasm without regard for broader societal implications or practical limitations.

We do not advocate seeing the world as either binary construct. Whether the idea of MaaS will be realised in full form or is mere hype is still unknown, but we can be sure that greater disruption led by technology is on the horizon. At ITLS we undertake research to inform, but it is up to industry and government to deliver on the promises of these future innovative services. We should never dismiss new technologies and business models, but rather keep an open mind and put our best foot forward ready to seize opportunities as they arise. Risk-taking and the willingness to embrace change is a critical part of success. After all, in the words of Greek philosopher Heraclitus, “change is the only constant in life”.

The ITLS intelligent mobility and MaaS program of research is led by Professor David Hensher and Professor Emerita Corinne Mulley, with Dr Chinh Ho, Honorary Professor John Nelson and Yale Wong as key contributors. ITLS has also established accreditation and professional development opportunities for the bus and coach industry including the Certificate of Transport Management (CTM) and the Bus and Coach Operator Accreditation Scheme (BOAS). For more information, please visit <http://sydney.edu.au/business/itls>.