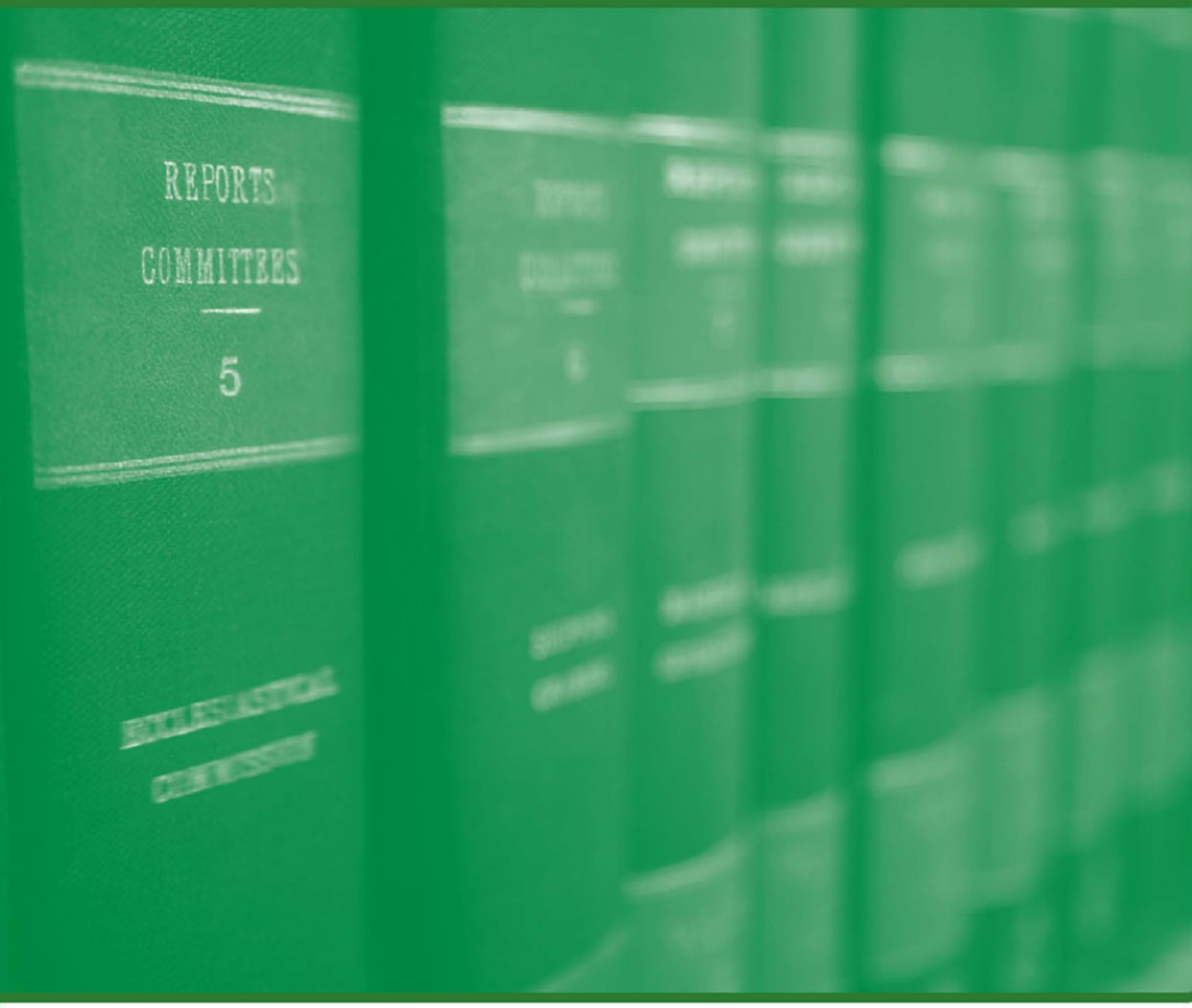
Legislative Assembly of New South Wales

Committee on Transport and Infrastructure

Report 2/57 – December 2021

Transport Technology Sector



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The motto of the coat of arms for the state of New South Wales is “Orta recens quam pura nites”. It is written in Latin and means “newly risen, how brightly you shine”.

Contents

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Chair's foreword

Ensuring a productive, connected society, requires transport infrastructure to expand and innovate to support NSW's growing population. Emerging transport technology has the potential to improve the experience and safety of customers in urban and regional areas, as well as decrease congestion and pollution in our cities.

Our inquiry looked at both the benefits and challenges of transport technology. While technology has the ability to revolutionise transport in NSW, the Government must continue to liaise with stakeholders and provide a foundation of appropriate regulation to ensure that technology implementation meets the needs of all customers, promotes safety and protects individual's privacy.

The Committee focussed on four key areas of emerging transport technology:

- Mobility as a Service (MaaS)
- first and last mile solutions
- real time transport information and
- Connected and Automated Vehicles (CAVs)

The Committee also focussed on how technology innovations can improve access and safety for travellers, with consideration of women's protection. We heard from women's safety and disability advocates about their experiences, challenges and hopes for the future of transport in NSW.

Inquiry stakeholders told us that they are excited about the opportunities in NSW to improve transport through the use of technology. A significant number of stakeholders have already participated in partnerships and innovation projects with Transport for NSW and reflected that these had been constructive, positive experiences. We were pleased to hear that collaboration is occurring and encourage Transport for NSW to continue to work with industry partners to develop and implement transport technology.

We heard that MaaS platforms, real time journey management and first and last mile solutions are already being used and developed in NSW.

The Committee found that MaaS platforms provide meaningful improvements for customers by providing multi-modal connections and payment channels and encourage Transport for NSW to continue to work with the industry to more fully implement MaaS state-wide.

We heard that real-time journey management has the potential to provide customers in urban and regional communities with more convenient, better connected journeys as well as assist with traffic management and planning. We commend Transport for NSW on the development of real-time data use and collection and encourage them to continue this work, as well as further

explore how it could be used to improve disability access and traveller safety, including for women.

However, the Committee notes the concerns raised about the impact increased data collection can have on individuals' privacy and we encourage Transport for NSW to ensure that privacy is protected.

The Committee was pleased to hear that first and last mile transport offerings have improved and we encourage continued work in this space and the inclusion of these offerings into MaaS platforms. A related challenge raised by participants was the integration of bicycles, motorcycles and other micro-mobility vehicles (such as e-scooters) conveniently and safely into the broader transport network. Micro-mobility vehicles are particularly effective as first and last mile transport solutions, reduce pollution and can help alleviate congestion. Noting these benefits, the Committee recommends that Transport for NSW consults with road-user advocates to ensure these transport options are effectively integrated into the network.

The Committee heard that women are more likely to feel unsafe on public transport and that more needs to be done to ensure women can access tailored information and services that helps them plan and take journeys where they feel safe. We found that improving women's safety requires consultation with advocacy groups and that an effective solution must acknowledge the possibilities for technology whilst maintaining physical support and staffing at transport hubs. We recommended that Transport for NSW ensure this consultation with women's advocacy groups takes place to improve traveller access and safety through technology, such as journey planning and more broadly through staffing and infrastructure changes to transport service networks.

Disability advocacy groups told us that whilst technology had the potential to improve their access to transport, that a whole-of-journey approach to development is required to ensure the technology is accessible by design. We found that people with disability have different customer experiences with a range of transport technology, including wayfinding and journey planning and that to address this issue, they need to be involved at the consultation and planning stage, to improve traveller access and safety. We therefore recommended that Transport for NSW apply a whole-of-journey approach when developing transport technology to ensure equitable access for people with disability.

The Committee heard that pedestrian safety is an ongoing concern and that the increased use of micro-mobility vehicles has increased the number of hazards on the footpath particularly for people with a vision impairment. We found that the current restrictions may not be sufficient and recommend that Transport for NSW investigate the use of micro-mobility vehicles on footpaths including the consideration of imposing speed limits for these vehicles. Road user safety in regards to CAVs was also raised by a number of inquiry participants and we found that more must be done to ensure that the rules and regulations implemented, address any shortcomings, including in relation to personal injury liability.

While the Committee acknowledges the challenges raised in regards to transport technology, we were pleased to hear that all inquiry participants are enthusiastic about the opportunities

technology provides to improve transport for all customers. We believe that with careful planning that includes the perspectives of all customers and industry partners, technology will continue to make significant improvements to the way people travel in NSW.

Finally, I would like to thank my Committee colleagues for their valuable contributions throughout the inquiry process. I would also like to thank the Committee staff for their professionalism and support in conducting the inquiry.

Robyn Preston
Chair

Findings and recommendations

Chapter One – Technology to improve transport services

1.1 This chapter discusses how technology is being leveraged in the transport sector to enhance the customer experience. It outlines the current state of play as well as opportunities for innovation across:

- Mobility as a Service (MaaS),
- real time journey management, and
- first and last mile services.

1.2 We heard from inquiry participants about how these three data-driven solutions work best in tandem to provide better integrated, more accessible transport and journey options for customers.

1.3 Transport for NSW (TfNSW) highlighted how transport technology is currently being utilised throughout NSW and how technology is a cornerstone of its plans for the future, as detailed in the NSW Government *Future Transport Technology Roadmap 2021-2024*.[1] We also heard from a number of key players in the sector, including Transdev Australia, the Australia New Zealand Driverless Vehicle Initiative (ADVI), iMOVE Australia and Lynxx. These organisations have extensive experience in providing and researching transport technology, and have collaborated in different permutations, including with TfNSW, on transport projects both in Australia and globally.

Mobility as a Service (MaaS)

Finding 1

While elements of Mobility as a Service technologies have been adopted by Transport for NSW, the Committee encourages Transport for NSW to continue to work with the transport technology industry to fully implement Mobility as a Service, such as through multi-model connections and payment channels.

Recommendation 1

That Transport for NSW continue to promote local research and development partnerships with industry stakeholders to provide advanced Mobility as a Service transport solutions.

What is MaaS?

1.4 MaaS is a framework that allows customers to plan, book, pay and provide feedback for a full range of transport services using integrated digital channels. MaaS combines multiple transport modes, such as cars, ride-share, public transit and active (such as walking and cycling) transport options, and allows a customer

[1] NSW Government, Future Transport Technology Roadmap 2021-2024, viewed 30 November 2021

to plan and purchase tickets from numerous service providers for the whole journey using a centralised platform and a streamlined payment process. By integrating these functions in a single system (most commonly a smart phone application), MaaS provides customers with a flexible, seamless and personalised transport experience.

1.5 We heard from a range of inquiry participants that are supportive of MaaS developments being undertaken by TfNSW in partnership with industry stakeholders. We recognise the benefits of MaaS as it is able to provide more adaptive and seamless journeys for customers and we therefore encourage TfNSW to continue to work with the transport technology industry to fully implement MaaS, especially in areas such as multi-model connections and payment channels.

1.6 Transdev noted that the challenge of MaaS technology is to develop systems that effectively integrate the following processes into a single application:

i) multi-modal journey planning;

ii) real-time information;

iii) booking; and

iv) single payment and access validation.

1.7 Transdev told us that it is only by effectively integrating these services that MaaS has the potential to make customers 'think of not using their car' and instead use public transport to make their journey. [2]

1.8 It was clear to us that MaaS is experiencing significant growth in recent years in response to increasing density and urbanisation, facilitated by the increased uptake and use of personal devices by customers to plan and access transport.

1.9 TfNSW has identified MaaS as an avenue to investigate in its Future Transport 2056 strategy, and has already taken steps to explore what MaaS can provide for customers.[3] An example is the 2019 MaaS Innovation Challenge, which called on local and international organisations to develop ways of facilitating desirable and useful alternatives to car ownership.[4]

1.10 The NSW Government highlighted the importance of encouraging sector-wide involvement in MaaS. TfNSW has created the Future Transport Digital Accelerator (FTDA) which enables innovators and start-ups to collaborate more directly with TfNSW, including through access to transport data.[5]

1.11 TfNSW has also launched the MaaS platform 'Opal Connect,' which offers planning, booking and payment options to customers for end-to-end journeys across public and privately operated transport. Furthering the aim to provide a comprehensive MaaS platform, Opal Connect has integrated the On Demand transport service (a

[2] Mr David Le Breton, Head of Mobility, Transdev Australia, Transcript of evidence, 15 October 2021, p3

[3] Submission 15, NSW Government, p3

[4] Submission 15, NSW Government, p7

[5] Submission 15, NSW Government, p24

flexible public transport service designed to improve connections to transport hubs and popular destinations, like shopping centres or hospitals).[6]

1.12 Opal Connect is currently operating on routes throughout Sydney, Newcastle and Regional NSW, and provides customers with the ability to book transit from their homes or a convenient location at a time that suits them and connect from an on demand service to traditional public transport. It incentivises adoption of these journeys by providing travel credits to customers who connect onto public transport services. The NSW Government described these services as combining 'the convenience of point to point services like taxis and rideshare, with shared rides with other customers helping to keep the fares lower.'[7]

1.13 We also heard how Opal Connect is connecting private cars and public transport to create more seamless journeys by providing customers free entry to Park&Ride commuter car parks when they connect to public transport for the next step of their journey.[8]

1.14 Other inquiry participants supported this approach, and emphasised that the ongoing involvement of the Government was vital to their ability to develop MaaS in NSW.[9] Transdev stated that they considered TfNSW was positively engaged with MaaS technology noting that the development of the Opal Connect platform has put 'Sydney at the forefront in that field.'[10]

MaaS moving forward

1.15 Inquiry participants were positive about the potential of MaaS, with iMove telling us that MaaS has the potential to 'solve bigger transport related issues (congestion, environment, safety).'[11] However, we heard that continued data and revenue sharing arrangements, as well as government involvement and a solid regulatory framework, are crucial to ensure that MaaS develops into an engaging and viable prospect for businesses and consumers.[12]

1.16 Lynxx stated that the wider transport technology market could, and should, grow:

> … if we have the right mechanisms and there are regulatory constructs, which would work to ensure that we were incentivised to grow the pie and not just spread what already exists.[13]

1.17 We heard from participants that the following areas need to be addressed by TfNSW in order to provide a regulatory environment that best facilitates the development of MaaS in NSW:

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[6] Submission 15, Transport for NSW, p5; NSW Government, Future Transport 2056, Improving public transport, viewed 26 November 2021

[7] Submission 15, NSW Government, p5

[8] Submission 15, NSW Government, p5

[9] Submission 10, Transdev Australasia, p8; Mr McInnes; Transcript of evidence, 15 October 2021, p7

[10] Submission 10, Transdev Australasia, p8; Mr Le Breton, Transcript of evidence, 15 October 2021, p3

[11] Submission 7, iMove, p1

[12] Ms Rita Excell, Executive Director, Australia New Zealand Driverless Vehicles Initiative (ADVI), Transcript of evidence, 15 October 2021, p6; Mr Le Breton, Transcript of evidence, 15 October 2021, p6

[13] Mr Matt McInnes, Managing Director, Lynxx, Transcript of evidence, 15 October 2021, p6

i) building partnerships and data sharing;

ii) protecting data security and privacy;

iii) providing a robust regulatory framework to ensure that MaaS responds to genuine public needs; and

iv) promoting innovation and completion by providing avenues for investors to successfully monetise MaaS offerings in NSW.

1.18 TfNSW and the other inquiry participants agreed that partnerships are critical to deliver a comprehensive, affordable MaaS offering, as it relies on the integration of both public and privately operated transport and mobility services.[14] TfNSW advised that they intend to focus on strengthening existing, and developing new, partnerships with private providers.[15]

1.19 To support this goal, TfNSW launched its Research Hub in 2018, which fosters innovation and collaboration across the public and private sector in the transport space. Research projects undertaken in the Hub include examinations of MaaS business models, which was a project undertaken collaboratively between TfNSW, iMove and the University of South Australia. TfNSW told us this project gave insights into how MaaS can function under different policy and regulatory scenarios, and what pragmatic action TfNSW can undertake to better enable and regulate MaaS.[16]

1.20 TfNSW also reflected on its 'MasS Innovation Challenge' held in 2019, telling us that it provided 'valuable insights related to customer behaviour, mobility service options and other matters.' The Challenge reinforced TfNSW's view that a MaaS solution should be built on the existing structure of TfNSW integrated mobility services, including the Opal platform.[17]

1.21 Many inquiry participants were optimistic about the potential for MaaS to have a positive impact on mobility in NSW, including by reducing congestion and pollution, and providing more personalised, accessible transport for customers. They agreed with TfNSW that data sharing and partnerships were crucial to achieving these aims, and are actively involved in the ongoing development of MaaS in NSW.[18]

1.22 Lynxx proposed that transport data created and used by MaaS should be kept in an open ecosystem that is based on equal access and contribution, meaning that those who use data should also have to put their data back into the ecosystem for the benefit of all collaborators. While this would ensure collaboration and innovation, Lynxx acknowledged that privacy and data security are paramount concerns and that customer participation in such an ecosystem would therefore

[14] Ms Excell, Transcript of evidence, 15 October 2021, p6; Mr Le Breton, Transcript of evidence, 15 October 2021, p6;

[15] Submission 15, NSW Government, p7

[16] Submission 15, NSW Government, p7

[17] Submission 15, NSW Government, p7

[18] Submission 11, Australian Driverless Vehicle Initiative (ADVI), p7; Submission 10, Transdev Australasia, p8; Ms Excell, Transcript of evidence, 15 October 2021, p6;

need to be voluntary.[19] Privacy and data security and discussed further in chapter 2.

1.23 We asked inquiry participants how the MaaS ecosystem should be funded, noting international examples of private MaaS providers taking a commission on ticket sales to encourage new entrants into the market to drive innovation. Inquiry participants generally agreed that the government must implement a strong regulatory framework to ensure the right incentives are driving the MaaS market, so that equitable transport options are provided that meet the needs of the whole community.[20]

1.24 Lynxx described how it takes a risk-sharing approach to investment in their global ventures, meaning that they take a lower commission on traditional journeys, and a greater risk share when they are providing new journeys to public transport networks. Lynxx told us that this model acknowledges the cost to companies of establishing these journeys. The company considered that this commission model provides more scope for competition and innovation in the market, without which the government would have to develop and deploy MaaS platforms itself, leading to a slower rate of development.[21]

1.25 ADVI also spoke to this issue, and described how it was focussed on ensuring equity in the rapidly growing transport market. ADVI considered that public transport should be accessible to everyone, and therefore government involvement and partnerships were important to ensure equity of access and that the public transport system is grounded on more than the capacity to carve out a commission.[22]

1.26 ADVI advocated for government involvement to ensure the necessary systems, infrastructure and regulation is in place to provide a solid basis from which innovating businesses can offer their services. [23] The issue of accessibility will be discussed throughout the report, particularly in chapter 4 when considering access for people with disability.

1.27 Transdev agreed with ADVI, and proposed that MaaS should remain as 'a tool in the hands of public transport authorities to organise and pilot their local sustainable mobility policy.'[24] They also argued that excellent MaaS platforms will attract more users, which should provide more opportunities for companies to earn a commission and drive innovation, whilst in turn driving prices down for individual customers.[25] This notion of cheaper prices was supported by iMOVE, who told us that their research has shown that pricing signals have a meaningful

[19] Mr McInnes, Transcript of evidence, 15 October 2021, p2;

[20] Mr McInnes, Transcript of evidence, 15 October 2021, p8; Ms Excell, Transcript of evidence, 15 October 2021, p6; Mr Le Breton, Transcript of evidence, 15 October 2021, p7; Mr Christensen, Transcript of evidence, 15 October 2021, p7

[21] Mr McInnes, Transcript of evidence, 15 October 2021, p5-6

[22] Ms Excell, Transcript of evidence, 15 October 2021, p6

[23] Ms Excell, Transcript of evidence, 15 October 2021, p6

[24] Mr Le Breton, Transcript of evidence, 15 October 2021, p6

[25] Mr Le Breton, Transcript of evidence, 15 October 2021, p7

effect on community behaviour, and that discounted prices may be required to encourage the use of public transport. [26]

1.28 Lynxx and iMOVE also suggested that services, such as public pool access, may be integrated into a MaaS platform providing an additional revenue stream for developers. iMOVE suggested that those 'adjacent activities could pay for their participation on the MaaS platform.' This could provide the revenue needed to discount fares for public transport which in turn would drive behaviour change to increase user uptake.[27]

Real time public transport journey management

Finding 2

The Committee commends Transport for NSW on the development of real-time public transport journey management platforms to provide customers with better connected journeys and improved customer experience, noting the potential for further development in disability access and traveller safety, including for women.

What is real time public transport journey management?

1.29 Real time public transport journey management requires a range of complex, interconnected sensors and systems. It delivers significant benefits, not only to consumers, but also to TfNSW, who use this information to better plan transport infrastructure and policy. We heard how it can provide customers with integrated, timely information about their journey, delivering a better customer experience. It can provide real time data about service disruptions, COVID-safe travel and points of congestion, which allows customers to make a more informed decision about how they travel. We consider these aspects to be essential for providing customers with better connected journeys and note the potential for further development in disability access and traveller safety, including for women.

1.30 Inquiry participants emphasised how important data-sharing and access is to ensuring other transport technologies (including MaaS) can deliver meaningful services to customers, as well as driving innovation within the sector.

1.31 With effective real time public transport journey management in place, customers can:

- make more informed decisions about how they travel;
- opt-in for notifications which use artificial intelligence (AI) and smart systems to anticipate their needs; and
- personalise journey information to their preferences.

1.32 TfNSW offer customers a real-time view of many of NSW's transport and mobility services, as well as using the data it collects to improve transport flow and other

[26] Mr Ian Christensen, Managing Director, iMOVE Australia, Transcript of evidence, 15 October 2021, p7

[27] Mr Christensen, Transcript of evidence, 15 October 2021, p7; Mr McInnes, Transcript of evidence, 15 October 2021, p6-7

services.[28] Lynxx told us that 'NSW is already a global leader in this space with open data solutions and initiatives (so should be commended).'[29] This sentiment was echoed by Transdev in their submission which said:

> NSW is already a global leader in the application of real-time technology applications including Open Data solutions and initiative which enabled the greater collation and sharing of data to enable better customer outcomes and community benefits via reduced congestion.[30]

1.33 Inquiry participants told us that real time public transport journey management is highly favoured by customers, and increases their willingness to use public transport services. ADVI viewed that real time data would facilitate the on demand services which are preferred by the community, as revealed in their surveys. 58 per cent of respondents 'somewhat' or 'strongly agreed' with the statement that they would be more receptive to riding on automated public transport if it was available on demand.[31]

Current availability and use of real time data

1.34 TfNSW advised that they use smart sensors and intelligent systems powered by Artificial Intelligence (AI) and machine learning to provide real-time and near real time data. However, this data is not only used by customers. TfNSW told us this can also be used for service management, dynamic prioritisation, and incident management, and it is continuing to expand the utilisation of the available data.[32]

1.35 One example TfNSW provided to highlight the benefits of an intelligent system was the Public Transport Information and Priority System (PTIPS).This uses real time data to provide priority for buses and light rail at signalled intersections, which on average can bring a late running bus back on schedule within 8 stops, congestion permitting. TfNSW told us they are continuing to improve and develop these technologies to create tangible improvements for customers.[33]

1.36 Customers can also directly access real time information through the TfNSW website and the Opal Travel app, which has been significantly upgraded to ensure it meets user needs. TfNSW highlighted how, in a world-first during the COVID-19 pandemic, they introduced personalised COVID Safe travel notifications to customers via the Opal Travel app to provide updates on physical distancing capacity on train, metro, bus and ferry services. This innovation won the 2021 Web Excellence Award for Excellence for Apps and Mobile.[34]

1.37 TfNSW explained how much of the real-time data they collect is provided through open access to customer and business information. For example, Live Traffic NSW (operated by TfNSW) has engaged with partners in Google, Waze and TomTom to

[28] Submission 15, NSW Government, p9
[29] Submission 4, Lynxx, p8
[30] Submission 10, Transdev Australasia, p9
[31] Submission 11, ADVI, p7
[32] Submission 15, NSW Government, p9
[33] Submission 15, NSW Government, pp10-11
[34] Submission 15, NSW Government, p10

deliver highly detailed data feed for mapping providers, which in turn improves the accuracy and reliability of third party systems.[35]

1.38 Real time information is also available to customers through external applications including NextThere, TripView, Trip Go and Anytrip. Additionally, applications like Stop Announcer and Metcare include accessibility feature for users with limited mobility or hearing impairments. Real time transport data will be further discussed in Chapter 4 in the context of accessibility for persons with disability.

1.39 TfNSW informed us about a number of projects that are utilising real time data to improve transport systems:

i) TfNSW Open Data Hub and the NSW Data Analytics Centre, provide a source of aggregated data which is shared with industry partners. This data is used by TfNSW network managers and external developers alike on a wide range of projects.[36]

ii) TfNSW are working with CSIRO's Data61 team to develop ways to integrate real-time transport data into a transport digital twin for the pilot area in Western Sydney.[37] A digital twin is a 3D model of cities and communities that is designed to facilitate better planning, design and modelling for future transport needs, and can also be shared as a platform to facilitate further transport innovation. The Western Sydney digital twin incorporates real-time traffic data and uses AI to predict congestion to assist with developing congestion management systems.[38]

iii) TfNSW are also considering a trial of RFID chips in students' backpacks that can be integrated with school buses. This will help parents know when to collect their child, preventing congestion caused by waiting near a bus stop. It also aims to reduce the risk of accidents, as children will not be distracted by finding and tapping their Opal card when boarding and disembarking a bus.[39]

First and last mile transport services

Finding 3

The Committee commends Transport for NSW on its development of first and last mile transport offerings to improve customer mobility and convenience, and notes the potential for further development and integration of these services in MaaS network offerings.

Recommendation 2

That Transport for NSW undertake further investment and trialling of automated vehicle services to develop more universal options for integration in first and last

[35] Submission 15, NSW Government, p12

[36] Submission 15, NSW Government, p13

[37] Submission 15, NSW Government, p13

[38] Submission 15, NSW Government, p13

[39] Submission 15, NSW Government, p10

mile service solutions, with particular consideration for how this may assist the elderly.

What are first and last mile transport services?

1.40 First and last mile services aim to bridge the transport gap at the beginning or end of a journey. It typically includes public transport, on demand or ride share services, and cycling and walking connections. These gaps have been identified as discouraging the use of public transport. Technology, including automation and MaaS, can therefore play an important role in improving these services to reduce friction between different sections of a journey.

1.41 We recognise TfNSW's integration of first and last mile transport services in order to successfully implement MaaS offerings and improve customer mobility and convenience. We also recognise and encourage the potential for further development and integration of these services in MaaS network services.

1.42 The benefits of first and last mile transport services include:

- reduced walking distance;
- improved convenience for customers; and
- increased uptake of public transport.

1.43 TfNSW told us about the current progress in this area, including that Sydney is one of the first cities in the world to launch an Uber and Transit feature, which allows individuals to book a journey using the best combination of UberX rideshare and public transport.[40] This collaboration is also an example of the uses of real time public transport data, which is essential to providing customers with the best journey options.

Transport for NSW projects

1.44 TfNSW are trialling a number of initiatives to improve first and last mile transport offerings in NSW. These projects often involve the use of other transport technology discussed throughout this report, including real-time information, the Opal Connect MaaS platform and Connected and Automated Vehicles. These projects include:

i) Trials integrating Opal digital ticketing with other, non-public transport options. From mid-2021, customers using Opal ticketing have gained credit on their Opal account when they transfer to public transport from Uber, a fixed fare Ingogo taxi trip or a Lime bike journey using their Opal card – essentially, if a customer uses public transport within 60 minutes of their private/alternative transport trip, they are credited with $3.00 to their Opal account.[41] We heard from inquiry participants that the willingness of TfNSW

[40] Submission 15, NSW Government, p14

[41] Submission 15, NSW Government, p14

to provide financial incentives to customers, as is being trialled in this project, was key to the success of public transport systems.[42]

ii) Improved services due to changing customer behaviour in light of the COVID-19 pandemic. Inquiry participants told us that commuters are now more aware of crowding and may be hesitant to travel at peak times.[43] TfNSW has responded by assisting businesses to encourage changes in travel behaviour patterns, including first and last mile options, that aim to spread customer demand more efficiently across the day.[44] Also in regards to the pandemic, we heard from Transdev that COVID-safe first and last mile options may take the form of automated, on demand services, which can be highly personalised. In Transdev's experience, these services are more trusted by customers who may otherwise be unwilling to take public transport.[45]

iii) TfNSW has so far rolled-out 23 pilots and five permanent on demand services across regional and metropolitan NSW.[46] Again, inquiry participants emphasised the interconnectedness of transport technology, as real time data and information sharing is crucial to ensuring that these on demand services provide smooth transfers for customers and meet genuine needs.[47] TfNSW highlighted that this is particularly important for on demand services in areas with low frequency public transport. For example in Woy Woy the service uses a feature to integrate real time train data so if there are delays on a connecting train, on demand customers would be notified, and their pick up times adjusted.[48]

Automated Vehicles and micro-mobility as first and last mile solutions

1.45 Automated vehicles were also discussed as a potential way of improving first and last mile transport. ADVI presented data from their 2021 survey which indicated that nearly 50 per cent of respondents were willing to travel in an automated shuttle or minibus in conjunction with a public transport trip. ADVI told us that this was a high proportion of people, especially considering that their surveys also show a declining community acceptance of the safety of automated technology; demonstrating to ADVI that 'the need for enhanced first and last mile services may outweigh the perceived concerns.'[49] We therefore consider that TfNSW should undertake further investment and trialling of automated vehicle services to develop improved first and last mile service options, particularly where this could assist the elderly or retirement home communities.

1.46 ADVI told us how there is opportunity in the first and last mile market to use driverless or automated vehicles, and how this could be used to better service people who may require additional support to make a connection or reach their destination. ADVI highlighted how the elderly may benefit from these services

[42] Mr Le Breton, Transcript of evidence, 15 October 2021, p3

[43] Submission 11, ADVI, p4; Mr Le Breton, Transcript of evidence, 15 October 2021, p3

[44] Submission 15, NSW Government, p14

[45] Mr Le Breton, Transcript of evidence, 15 October 2021, p3

[46] Submission 15, NSW Government, p14

[47] Submission 4, Lynxx, p8

[48] Submission 15, NSW Government, p15

[49] Submission 11, ADVI, p8

which could significantly reduce the need to walk to traditional transport stops, allowing them to remain more independent. ADVI have conducted limited trials in Australia, including in retirement and aged care villages, however acknowledged that more needed to be done from a regulatory and infrastructure perspective to expand the use of these technologies.[50]

1.47 Transdev also supported the use of automated vehicles in first and last mile journeys, as they offer a 'compelling value proposition' due to their capacity to combine on demand solutions, enhance the efficiency of current transport networks by providing greater flexibility, and encourage customers to connect to other public transport services.

1.48 Transdev emphasised that there are examples of this solution working. For example, it has operated automated shuttles in closed networks (private roads) since 2005 and is currently piloting services on open sites (public roads). One of these trials took place on the University of New England campus in Armidale, where fully automated shuttles provided a regular service between the residential colleges and the main university campus. However, Transdev consider that these solutions are currently limited, as they have only been trialled at speeds of approximately 20 km per hour and more investment and trialling is needed before it will be a more universal option.[51]

1.49 We also heard from Bicycle NSW that micro-mobility (such as e-scooters and hire bikes) and active transport (such as cycling and walking) could play an important role in bridging the first and last mile transport gap for customers. However, Bicycle NSW told us that these options currently do not integrate well into the rest of the network, and infrastructure and regulatory issues need to be addressed to facilitate access for these options.[52] Micro-mobility and active transit are discussed in further detail in Chapter 2.

[50] Submission 11, ADVI, p8-9

[51] Submission 10, Transdev, pp10-11; Mr Le Breton, Transcript of evidence, 15 October 2021, pp2-3

[52] Submission 6, Bicycle NSW, pp2-3

Chapter Two – Challenges of Transport Technology Services

2.1 This chapter examines potential challenges that may arise when implementing transport technology, including privacy and data security, integration, current limitations, and regional and remote access.

2.2 We also heard about challenges facing people with disability when accessing transport, which are covered in more detail in chapter 4.

Privacy and data security

Recommendation 3

That Transport for NSW ensure that data collected for the development and delivery of transport technology services appropriately balances service delivery with the privacy of customer data.

2.3 Transport technology services rely on the collection of customer transport data to improve services, which carries privacy concerns regarding the security and use of such data.

2.4 We consider these concerns to be of merit as customers using our public transport system must have confidence that their individual data and personal information is safe from security threats or unacceptable uses, such as marketing purposes.

2.5 Therefore, TfNSW must ensure that data collected for the development and delivery of transport technology services appropriately balance service delivery with the privacy of customer data.

2.6 The Australian Driverless Vehicle Initiative (ADVI) presented research showing that 33 per cent of men and 36 per cent of women are 'concerned' or 'very concerned' about data privacy (for example tracking the location of their car).[53]

2.7 TfNSW collects a large amount of data, both from customers and also using sensors and other purpose-built technology to track transport services. This data is de-identified and made available on the TfNSW Open Data Hub, where industry partners can access it for the development of their own technology, often done in collaboration with TfNSW.[54] ADVI informed that there are multiple private organisations who sell the data collected from customers for a range of purposes, including traffic management.[55]

2.8 Inquiry participants were generally very supportive of the open-data environment fostered by TfNSW, and agreed that other industry participants should take the same approach and share their data. Lynxx acknowledged the privacy concerns,

[53] Submission 11, ADVI, p10

[54] Submission 11, NSW Government, p11

[55] Submission 11, ADVI, p10

and cited them as a key reason why they consider the collection and processing of primary data should be undertaken by an independent central body like TfNSW, as they have an incentive to protect individuals' privacy. Lynxx stated that they believed at present that:

> … there is an awful lot done to ensure that there cannot be the exploitation of individuals or the commercialisation of individual data where it is not in the best interests of the wider ecosystem.[56]

2.9 When asked about individual privacy concerns and commercial organisations profiting from the data collected, Lynxx explained that laws and rules must be established to 'ensure the mechanisms involved in data exchange and transfer are transparent, open and credible' because 'privacy and protection of data needs to be paramount.' Lynxx considered this means that 'individuals should be in control of their own data, and if they do not want to contribute, then they should not be obliged to.' The company provided the European General Data Protection Regulation (GDPR) as a world-leading example of regulations which contain meaningful consequences for breaching them. Lynxx noted that the Australian privacy laws do not provide for similarly meaningful consequences when organisations fail to comply.[57]

2.10 In regards to Connected and Automated Vehicles, Maurice Blackburn considered that data collected should only be used for public benefits, such as identifying who was in control of a vehicle or showing potential faults in an automated system. They stated that:

> … data collection from Connected and Automated Vehicles should be restricted to circumstances where the end beneficiary of the data collection is the general public, not government agencies or commercial interest who stand to benefit from the data collection.[58]

2.11 Privacy was also raised as a concern in regards to CCTV footage and the use of AI to provide real-time data that could assist in improving safety on public transport (see Chapter 3 for more information about this model). The SMART Infrastructure Facility stated that it was highly important that these AI systems do not identify individuals, and instead are used as a tool to assist humans with improving safety on public transport. Dr Johan Barthelemy, Chief Investigator of the SMART Infrastructure Facility, stated that without adequate privacy, public transport users would lose confidence in the system. Therefore TfNSW has an important role to play in ensuring CCTV does not identify individuals and is transparent with customers about how and when CCTV is being used.[59]

2.12 Maurice Blackburn Lawyers echoed the comments of the SMART Infrastructure facility when discussing the importance of privacy and consumer confidence in driverless vehicles and the potential data that could be recovered from them. They considered that this data may be very useful in assessing the capability and safety

[56] Mr McInnes, Transcript of evidence, 15 October 2021, p2

[57] Mr McInnes, Transcript of evidence, 15 October 2021, p2

[58] Submission 9, Maurice Blackburn, p2

[59] Dr Johan Barthelemy, Chief Investigator, The SMART Infrastructure Facility, Transcript of evidence, 15 October 2021, p13

of driverless and automated vehicles, but acknowledged that the government and industry must 'balance that up against the issue of privacy and the issue of people's trust and confidence in their vehicles that collect these large amounts of data, and privacy in and of itself and the use of data for other purposes.'[60]

2.13 Inquiry participants generally supported a robust regulatory and legal framework to ensure that data was protected, as they see this as key to ensuring both customer privacy and confidence in transport technology.[61]

2.14 TfNSW are aware of the importance of data security and privacy, and collect all data with these principles in mind. TfNSW also have an Artificial Intelligence Strategy, which is informed by the NSW Government's Artificial Intelligence Ethics Policy. These documents set out principles that are designed to ensure the safe, fair and appropriate use of AI in a transport setting.[62] It was advised that TfNSW work with the NSW Privacy Commissioner and are transparent with customers about the collection and use of their data.[63] However, many of the relevant technologies are still at the trial stage, and TfNSW are continuously working to better understand the data and how it can add value to TfNSW and the public without compromising user privacy.

Integration

Recommendation 4

That Transport for NSW consult with road user advocates, such as Bicycle NSW and Motorcycle Council of NSW, to address their concerns raised during this inquiry and encourage better integration of first and last mile services in journey planning technology.

2.15 The transport technology services of the future rely on connecting and integrating different modes of transport to build unique journeys for customers. This includes integrating:

- public transport (such as trains, buses, ferries and trams),
- active transport (such as walking and cycling),
- ride share services, and
- micro mobility options (such as bicycles, e-scooters and motorcycles).

2.16 We heard that the first step in creating this integration is to understand customer preferences about their preferred modes of transport. The NSW Government advised that TfNSW are 'investing in technology and data analytics to build deeper insights about its customers' end-to-end journeys and the diverse needs of

[60] Ms Katie Minogue, Principal Lawyer, Maurice Blackburn Lawyers, Transcript of evidence, 15 October 2021, p26

[61] Ms Minogue, Transcript of evidence, 15 October 2021, p26; Mr McInnes, Transcript of evidence, 15 October 2021, p2; Mr Barthelemy, Transcript of evidence, 15 October 2021, p13

[62] Submission 15, NSW Government, p19-20

[63] Submission 15, NSW Government, p19-20; Mr Lewis Clark, Acting Head of Technology and Innovation, Customer Strategy & Technology, Transport for NSW, Transcript of evidence, 15 October 2021, p31

different NSW communities.'[64] They told us that this information, combined with human-centred design, will deliver services in ways and places that consumers benefit from them the most.

2.17 However we also heard that Bicycle NSW and Motorcycle Council of NSW held concerns about a gap in the integration for micro mobility options. For example, utilising bicycles, scooters and motorcycles for first and last mile options. If addressed, such solutions could benefit different aspects of MaaS and first and last mile frameworks, create environmentally friendly transport and could even boost local tourism. We therefore consider it important that TfNSW consult with road user advocates, such as Bicycle NSW and Motorcycle Council of NSW, to address their concerns raised during this inquiry and encourage better integration of first and last mile services in journey planning technology.

2.18 TfNSW aims to use technology to deliver the '30 Minute City' vision for Greater Sydney, meaning that people can access both employment and services in their nearest city or strategic centre within 30 minutes of their home by public transport, seven days a week. TfNSW has worked alongside local data strategy and analytics specialist, Smash Delta, to design a platform that aims to improve public transport outcomes to help support this vision. This platform has been adopted as the transport performance methodology by the Greater Sydney Commission. It is regularly updated to provide continuous reporting on how this vision is being achieved and what additional steps need to be taken to improve outcomes.[65]

2.19 Improved kerb access that meets local needs was also identified by TfNSW as an area that required further monitoring to ensure it is used effectively. Kerbs provide important points or access for customers, and the integration of kerbside services and planning into the broader transport infrastructure will address bottlenecks and improve safety. TfNSW is operating a multi-modal Digital Smart Kerb Pilot with councils in Sydney's Western Parkland City to gather data on kerb use to ensure that future planning can optimise how they are allocated and controlled.[66]

2.20 We heard from Bicycle NSW that bicycles, e-scooters and similar small vehicles play an important role in transport, especially first and last mile connections, noting that walking to a transport connection point may be particularly difficult for the elderly, people with disabilities, parents with young children or those carrying heavy equipment or luggage.[67] Further, these options may assist to reduce congestion. For example, Bicycle NSW advised that one 3.5m traffic lane is able to move 2,000 people per hour in cars, but 14,000 by bicycle.[68]

2.21 However, Bicycle NSW raised concerns that the use of bicycles in particular was being hampered by a lack of suitable integration and infrastructure. They mentioned how bicycles are not easily carried onto public transport in NSW, and are not allowed at all on buses:

[64] Submission 15, NSW Government, p16

[65] Submission 15, NSW Government, pp17-18

[66] Submission 15, NSW Government, p17

[67] Submission 6, Bicycle NSW, p2

[68] Submission 6, Bicycle NSW, p4

> …taking bicycles on trains is difficult on some trains and requires boxing on others and booking ahead that does not always work. [This] can also be challenging on some of the new ferry models where the requirement to lift bicycles up high onto hooks is beyond the ability of many people.[69]

2.22 In addition, Bicycle NSW pointed out that there is often no secure storage available at stations or stops, which makes using a bicycle for a first or last mile connection unfeasible.[70] Bicycle NSW acknowledges that share e-bike schemes could assist with this without requiring additional storage on buses, however noted this is unlikely to be feasible outside of inner city areas, and therefore recommended that options for securely storing or carrying bicycles onto public transport also must be improved.[71]

2.23 We heard that current bicycle storage options are not meeting demand; with the Manly Ferry Terminal provided as an example of an area where demand for storage outstrips supply. Further, Bicycle NSW pointed out that options that have been developed, such as the bike storage on the new commuter ferries, has not been successful as they require bicycles to be lifted onto hooks, which is impossible for those with mobility impairments or e-bikes which can be very heavy.[72]

2.24 Further, Bicycle NSW told us how an increased capacity for bicycles on trains could play a meaningful role in revitalising local tourism within NSW, as their members frequently raised with them how beneficial this access would be to expand the locations in which they could ride.[73]

2.25 The Motorcycle Council of NSW raised concerns about motorcycle parking, giving the example of the new carpark in Ryde. It argued that it appeared facilities for motorcycle parking had been added as an afterthought as opposed to being included as part of the initial design. We heard that this lack of initial planning meant that motorcycle parking is often located in areas where motorcyclists must cross pedestrian walkways or are located in other inconvenient areas, and that motorcycle users need to be included in more decisions as road users.[74]

2.26 Bicycle NSW noted that micro-mobility options such as e-scooters and mono-wheels are increasing in popularity in NSW despite it being illegal to use these devices in public spaces. We received positive evidence about these devices as they can be more easily carried and therefore better integrate into the public transport network. They can also be easily stored in an office making them a more practical, secure option for some customers than a traditional bicycle or e-bike.[75]

2.27 We heard from Bicycle NSW and the Motorcycle Council of NSW that they support the use of these micro-mobility options, however their safety and utility need to

[69] Ms Bastien Wallace, General Manager Public Affairs, Bicycle NSW, Transcript of evidence, 15 October 2021, p23

[70] Ms Wallace, Transcript of evidence, 15 October 2021, p23

[71] Submission 6, Bicycle NSW, p3

[72] Submission 6, Bicycle NSW, p3

[73] Ms Wallace, Transcript of evidence, 15 October 2021, p25

[74] Mr Kevin Henry, Chairman, Motorcycle Council of NSW, Transcript of evidence, 15 October 2021, p24

[75] Submission 6, Bicycle NSW, p3

be adequately assessed and then enforced through regulations, standards and appropriate infrastructure.[76]

2.28 Bicycle NSW is concerned that 'these devices were not designed to mix with traffic and may not be suitable for use on most roads.'[77] It observed that most users avoid the road, and instead use the footpath, shared paths and cycle ways, which may pose a risk to pedestrian safety; however they noted that the greatest threat of injury or fatality on the road and road related areas is motor vehicles and that this should be reflected in policy around the use of micro-mobility options.[78]

2.29 Bicycle NSW also presented the opportunities for e-bikes to assist in improving transport options, while again flagging concerns about safety and adequate integration into the broader transport network. Bicycle NSW suggested however that the 'inadequate provision of safe, separate cycle ways that connect services such as restaurants with where people live' is a key factor in the rise in fatalities and injuries, noting the deaths of food delivery drivers in recent years.[79] To support their proposal that additional bike paths would improve safety, Bicycle NSW presented evidence of the trials of pop-up cycle ways in Waverley which have correlated with a reduction of injuries in the area.[80]

2.30 The submissions from Bicycle NSW and the Motorcycle Council emphasised that they felt a collaborative approach that includes all stakeholders is crucial to address these concerns and optimise transport options and integration in NSW.[81]

2.31 In response to these views, TfNSW advised that it regularly engages with key stakeholders, including Bicycle NSW and the Motorcycle Council, on a range of projects and issues, 'from major infrastructure and Active Transport projects, such as Parramatta Light Rail Warringah Freeway and Sutherland to Cronulla Active Transport Link, through to consultation on road safety campaigns and participation as members of the Road Safety Advisory Council.'[82]

2.32 TfNSW further noted that it had been consulting on first and last mile integration solutions:

> Transport for NSW has been consulting on the Regional Cycling and Micromobility plan, covering topics such as bike-train or bike-bus multi-modal integration, and bike parking. Integrating cycling and micromobility with public transport is among the six main objectives of this plan. Real-time Park&Ride car space availability is being implemented, which shows vacant parking spaces available in Park&Ride car parks.[83]

[76] Submission 6, Bicycle NSW, p4

[77] Submission 6, Bicycle NSW, p3

[78] Ms Wallace, Transcript of evidence, 15 October 2021, p24

[79] Submission 6, Bicycle NSW, p4

[80] Ms Wallace, Transcript of evidence, 15 October 2021, p25

[81] Mr Henry, Transcript of evidence, 15 October 2021, p25; Ms Wallace Transcript of evidence, 15 October 2021, p25

[82] Answers to questions on notice, Transport for NSW, 23 November 2021, p2

[83] Answers to questions on notice, Transport for NSW, 23 November 2021, p2

Limitations of available technologies

2.33 We heard from some inquiry participants that the limitations of certain technologies impact on their capacity to address the needs of all NSW road and transport users.

2.34 The Motorcycle Council of NSW raised concerns about current blind-spot monitoring technology and the potential use of similar technology in Connected and Automated Vehicles (discussed in detail in Chapter 5) and driverless vehicles. They explained that the technology often fails to identify the presence of motorcyclists, as well as cyclists or other micro mobility users because they do not travel in a straight line like larger motor vehicles do. The Motorcycle Council stated that they felt as though this places riders at significant risk, and perpetuated the idea that riders are solely responsible for their own safety. This fails to acknowledge that other vehicle users have a responsibility to be aware of riders on the road and keep a safe distance.[84] Mr Henry from the Motorcycle Council noted that motorcyclists accept that they must wear safety gear and keep a very careful lookout for vehicles, however he was concerned that riders may now be expected to also buy transponders, or take other precautions to avoid vehicles fitted with technology.[85]

2.35 While we heard from stakeholders that automated vehicles may provide customers with a safe and convenient transport option, other stakeholders raised concerns about the lack of trials that had been conducted. Transdev Australia noted that the use of automated vehicles cannot be fully explored or realised until further trials have been conducted.[86]

Regional and remote areas

Recommendation 5

That Transport for NSW further research and examine technology solutions to enhance safety on regional and rural roads.

2.36 We heard from stakeholders that customers in regional and remote communities are often underserved by public transport, and transport technology more broadly.[87] TfNSW has identified transforming mobility in regional NSW as a priority focus, and they told us that they are already rolling out technology such as real-time information delivery, the Transport Connected Bus program and digital ticketing, as well as partnering with organisations to improve a range of other transport services. These innovations aim to provide 'integrated, multi-modal and end-to-end journey in regional areas.'[88]

2.37 Other inquiry participants told us about the challenges facing regional and remote communities, and they shared TfNSW's vision and enthusiasm for development.

[84] Mr Henry, Transcript of evidence, 15 October 2021, p24

[85] Mr Henry, Transcript of evidence, 15 October 2021, p24

[86] Mr Le Breton, Transcript of evidence, 15 October 2021, p3

[87] Mr Le Breton, Transcript of evidence, 15 October 2021, pp2-3; Mr Christensen Transcript of evidence, 15 October 2021, p8

[88] Submission 15, NSW Government, p9

iMOVE told us that there are unique opportunities available in these areas to trial certain technologies, providing the example of how on demand transport services were being used in Moree to cost-effectively provide more frequent and accessible transport options. We heard that using a more traditional route system in these areas would be costly, and potentially underutilised, due to the more dispersed population.[89]

2.38 Further, we were presented with evidence that rural and regional areas suffer a higher per capita rate of accidents and fatalities on roads as opposed to urban areas, and that these accidents are typically related to driver behaviour and error. Inquiry participants told us this challenge presents an opportunity for transport technology to significantly enhance the wellbeing of these communities by improving safety on rural roads.[90] Given this, we consider it important that TfNSW undertake further research and examine technology solutions that could enhance safety on regional and rural roads.

2.39 Transdev Australia also highlighted that regional areas provide opportunities for driverless and automated vehicles, because they 'generally do not have the level of traffic congestion and interferences so we can test this technology.'[91] However, iMOVE Australia acknowledged that driverless vehicles currently work best on sealed roads with lines, and therefore adaptions and further testing may be necessary to allow them to operate safely in some rural settings.[92]

2.40 ADVI raised that Australia already has world-leading automated vehicle technology working in our mines, and that this demonstrated that the technology does have the capacity to work well in rural and regional NSW. ADVI emphasised however that this relies on other technology, such as highly accurate Global Positioning Systems (GPS). It stated that investments in this area would significantly assist the implementation of transport technology in regional NSW.[93]

2.41 Another challenge that may impact the implementation of transport technology is internet connectivity. A number of inquiry participants presented evidence that rural and remote communities have unique transport needs,[94] and we note that these areas may be less likely to have access to reliable, high-speed internet. Connectivity is the backbone of many transport technologies (such as MaaS) discussed by the inquiry participants. Rural and remote communities may therefore encounter difficulties in implementing these technologies.

[89] Mr Christensen, Transcript of evidence, 15 October 2021, p8

[90] Mr Christensen, Transcript of evidence, 15 October 2021, p9

[91] Mr Le Breton, Transcript of evidence, 15 October 2021, p8

[92] Mr Christensen, Transcript of evidence, 15 October 2021, p9

[93] Ms Excell, Transcript of evidence, 15 October 2021, p9

[94] Mr Le Breton, Transcript of evidence, 15 October 2021, pp22-23; Mr Christensen Transcript of evidence, 15 October 2021, p8

Chapter Three – Transport technology to improve women's safety

3.1 This chapter highlights how technology can be harnessed to improve women's safety when using transport. We heard from stakeholders that women perceive a greater risk to their safety than men when navigating urban areas, which leads to a significant number of women making alternative travel choices. These travel choices may be less convenient for them or result in the choice not to travel at all during certain times, such as after dark.

3.2 However, we also heard that transport technology has the potential to improve safety outcomes and help women to feel safer when travelling. Inquiry participants told us that artificial intelligence (AI) monitoring of transport, integration of safety preferences into MaaS and trip planning apps and better data collection all play an important role in achieving these aims.

Safety perception and journey planning technology

Finding 4

The Committee finds that technology and related data can help address safety concerns for gendered-based violence, however women must be actively considered and consulted in the development of this technology.

Recommendation 6

That Transport for NSW involve women's advocacy groups in the consultation stage for improving traveller access and safety through technology, including journey planning.

3.3 We heard from stakeholders that gender-based violence is an issue on public transport in NSW, and that gendered experiences of transport need to be considered during planning and development of technology to ensure the needs of the community are met.[95] Bicycle NSW stated that the experiences of women have not been appropriately considered in the past, and that 'deep work needs to be done' to research both gender and the intersectional impact of gender, ethnicity and disability on transport safety and experience.[96]

3.4 We received data that showed that women are more likely to perceive higher levels of risk on public transport, particularly when travelling at night, and that a significant majority of women have faced violence or harassment on public transport.[97]

[95] Submission 12, Guide Dogs NSW & ACT, p4; Submission6, Bicycle NSW, p5-6

[96] Submission 6, Bicycle NSW, p6

[97] Ms Zoe Condliffe, CEO and Founder, She's A Crowd, Transcript of evidence, 15 October 2021, p11; Submission 6, Bicycle NSW, p6

3.5 Therefore we consider that improvements to technology that address safety concerns of gender-based violence should be developed with the continuous involvement of women to ensure that their needs are genuinely understood and suitably met by the technology.

3.6 She's A Crowd informed that the issue of gendered safety and gendered violence is complex, and that collecting data and understanding the nuances of the problem is crucial to adequately address the issue. We heard from the She's A Crowd CEO and founder, Ms Zoe Condlife, that under-reporting of gendered violence is common, and likely due to a gap in data:

> … represents a gendered data gap between the actual experiences of women when moving around on public transport, wen at an event as well, and what authorities actually have in terms of data.[98]

3.7 She's A Crowd told us that the 2018 Sexism in the City report revealed that '9 out of 10 Australian women have said that they have experienced street harassment and have had to modify their behaviour as a result of that, and 46 per cent of women said that they felt unsafe on public transport.'[99]

3.8 We received evidence that strongly indicates that women are choosing to travel in urban areas differently because they perceive that they may be unsafe. This can be costly and time consuming, and some women are choosing to remove themselves from the situation entirely. Ms Condliffe noted that 12 per cent of women in Sydney choose not to go out at night at all because they felt unsafe moving around in urban areas.[100]

3.9 She's A Crowd also explained how gendered violence can be difficult to spot on public transport, going unnoticed especially when using passive surveillance such as CCTV. While male on male incidents are more likely to be violent and highly visible, violence against women is more 'subtle; it is usually quite opportunistic' taking the form of following, verbal harassment and intimidation that may not be immediately apparent.[101] She's A Crowd therefore emphasised that collecting data from women themselves about their experiences at different locations is crucial to building an accurate picture of safety across urban areas to inform policy and decision making.[102]

3.10 However, while most women have faced violence or harassment on public transport, we heard that individuals have varied responses when surveyed about what would make them feel safer. For this reason, Ms Condliffe considered that a personalised approach to tackling gender-based violence is preferred.[103]

3.11 She's A Crowd told us that data and technology has a particularly important role to play, as it can facilitate individual women being able to obtain relevant information

[98] Ms Condliffe, Transcript of evidence, 15 October 2021, p11

[99] Ms Condliffe, Transcript of evidence, 15 October 2021, p11

[100] Submission 5, She's A Crowd, p2; Ms Condliffe, Transcript of evidence, 15 October 2021, p11

[101] Ms Condliffe, Transcript of evidence, 15 October 2021, pp12-13

[102] Submission 5, She's A Crowd, p1

[103] Ms Condliffe, Transcript of evidence, 15 October 2021, pp11-12

and plan journeys that make them feel safe, without being paternalistic.[104] However, when She's A Crowd hosted a global ethics panel, they found that a journey planning tool that incorporates safety preferences should be marketed, not as a safety tool, but as a 'route preferences' tool, to acknowledge that safety is a very personal concept.[105]

3.12 We heard that technology and safety solutions must actively consider women to achieve these outcomes, and that too often the masculine response is considered the 'neutral response' when building models or technology.[106] She's A Crowd told us that '[h]istorically women have not been involved in the decision making processes of urban planning' which meant men often felt safer in cities designed for them.[107] She's A Crowd provided the example of how 'mainstream travel apps can take people down paths that are dark and isolated, and can leave people stranded if they miss a train or bus.'[108] Therefore, involving women in all stages of technological development is key to overcoming gender bias and creating tools that meaningfully improve women's experiences on public transport.

3.13 Ms Condliffe further described how technology can improve women's experience and safety on public transport. For example, algorithms for journey planners can use geolocation data to take into account safety preferences selected by the user. Much like how on Google Maps a user can select route options such as 'no tolls,' a user could instead opt for routes that were busier, or better lit.[109] This, combined with more information about areas where safety incidents may be more likely to occur, such as after large sporting matches, allows women to plan the safest route home, improving their confidence to travel.

3.14 She's A Crowd argued that fostering understanding and employing a 'gender lens to policy and planning' throughout the transport sector is crucial as there is a current lack of consideration of gender:

> … through research that She's A Crowd has conducted with the Department of Transport Victoria, we found that there is a lack of consideration and understanding of gender when developing and managing transport practices and processes.[110]

Safety and passive surveillance

Recommendation 7

That Transport for NSW address the issue of women's safety by balancing technology solutions and physical support, including analysing safety data collected by She's A Crowd to inform staffing and infrastructure changes to transport service networks.

[104] Ms Condliffe, Transcript of evidence, 15 October 2021, p12
[105] Ms Condliffe, Transcript of evidence, 15 October 2021, p11
[106] Ms Condliffe, Transcript of evidence, 15 October 2021, p13
[107] Submission 5, She's A Crowd, p2
[108] Submission 5, She's A Crowd, p3
[109] Ms Condliffe, Transcript of evidence, 15 October 2021, p11
[110] Submission 5, She's A Crowd, p4

Recommendation 8

That Transport for NSW recognise the important role that front line public transport staff play as contact points and to improve travellers' sense of safety, particularly after dark, and consider these factors when staffing public transport and stations.

Recommendation 9

That Transport for NSW continue to encourage technology development and collaboration opportunities that promote women's safety and traveller safety more broadly, including enhancing real-time data of incidents.

3.15 Inquiry participants told us that technology presents an opportunity to improve the experience of women on transport, but that human connection and a customer-focussed approach must always be the primary consideration as technology must be a tool, not the goal itself.[111] Inquiry participants advised that the amount of data collected focussing on women's experiences is currently not sufficient, and more needs to be done to ensure that decision makers have accurate information to guide planning and development of technology in the future. We heard that 'without this data, decision makers are lacking a nuanced understanding of the problem, and therefore solutions will also lack the depth that is needed to appropriately address these issues.'[112]

3.16 We recognise this balance between a technological solution and physical support is nuanced and individual, and that broad ranges of data are required to develop technology to ensure that individuals can make decisions that allow them to feel safe when travelling.

3.17 She's A Crowd found that a number of factors influence the route women chose to get home, and that 32 per cent of participants would be likely to change their route based on safety concerns, and indeed 78 per cent had previously changed a route because of this.[113] Factors that influence choosing a route include crowding data, lighting, passive surveillance where CCTV or staff are present, green spaces, open shops and places where there were other people are around.[114]

3.18 She's A Crowd noted that while there was significant variance in women's responses about what factors made them feel safe, generally the majority of women felt safer when other people were around, including during hours when train stations are staffed.[115]

3.19 She's A Crowd indicated that women they surveyed 'do not believe that ticketing staff are trained appropriately to respond to disclosures or to look for gendered elements of violence' and wanted to see the return of conductors. [116]

[111] Mr Clark, Transcript of evidence, 15 October 2021, p36; Ms Sue Wiblin, Executive Director Emerging Technologies, Customer Strategy and Technology, Transport for NSW, Transcript of evidence, 15 October 2021, p36

[112] Submission 5, She's A Crowd, p4

[113] Ms Condliffe, Transcript of evidence, 15 October 2021, p12

[114] Ms Condliffe, Transcript of evidence, 15 October 2021, p12

[115] Ms Condliffe, Transcript of evidence, 15 October 2021, p12

[116] Ms Condliffe, Transcript of evidence, 15 October 2021, p12-13

3.20 Ms Condliffe explained how automation has reduced the physical presence of staff, and that this has caused 'increased feelings of unsafety while travelling' for many women. Ms Condliffe remarked that in light of this evidence, staffing presents an issue when considering the role of automated, driverless vehicles in the future.[117]

3.21 A combination of staffing and technology could assist to respond to incidents in real time and protect public safety. The SMART Infrastructure Facility informed that CCTV is currently unmonitored in most cases, and therefore is often only used retrospectively as evidence of incidents. The Facility stated that using AI, supported by people on the ground, could make CCTV a more proactive tool that prevents incidents from escalating, for example by detecting anti-social behaviour.[118] The SMART Infrastructure Facility noted that they are conducting work at the University of Wollongong in partnership with TfNSW and Sydney Trains to investigate how AI can address these challenges whilst preserving the privacy of transport customers.[119]

3.22 iMOVE is another organisation looking at women's safety, including the enhancement of values such as safety and ambience in the technology.[120] We also heard that initiatives like the Greater Sydney Women's Safety Charter, which brought together over 80 organisations, have contributed positively to the growing conversation about gendered experiences of transport.[121]

3.23 The NSW Government highlighted steps TfNSW has taken to improve women's safety on public transport, and that they agreed with other inquiry participants that 'the data generated, shared and analysed by smart sensors and intelligent systems' underpins many of the improvements to women's safety that are being both implemented and developed. TfNSW are investing in AI and machine learning to provide 'real time situational awareness for network operators' with the aims of improving safety, not merely providing incident review.[122]

3.24 TfNSW has also launched the Women's Safety After Dark initiative, which is developing an AI algorithm to 'detect threatening behaviours on the transport network' which can then trigger an alert to security operators to raise an alarm and send support to the identified location. This technology is currently being trialled at Wollongong Station, and TfNSW will consider rolling it out in other settings and locations in the future.[123]

3.25 TfNSW are also working with She's A Crowd to develop an algorithm that would allow women to preference trips that make them feel safer. A report into this project is expected by the end of the year.[124]

[117] Ms Condliffe, Transcript of evidence, 15 October 2021, p12-13

[118] Dr Barthelemy, Transcript of evidence, 15 October 2021, p14

[119] Submission 8, The SMART Infrastructure Facility, p2

[120] Submission 7, iMOVE Australia, p6

[121] Submission 12, Guide Dogs NSW, p4

[122] Submission 15, NSW Government, p16; Dr Barthelemy, Transcript of evidence, 15 October 2021, p13

[123] Submission 15, NSW Government, p17

[124] Ms Wiblin, Transcript of evidence, 15 October 2021, pp35-36

Chapter Four – Technology to improve disability access

4.1 This chapter focusses on how technology can improve access to transport for people with disability. inquiry participants emphasised the need to focus on a whole-of-journey approach to minimise barriers for people with disability. The chapter also considers the need for disability advocates to be involved early in the design and development stages for new technology, and when consulting on pedestrian safety improvements.

Way-finding technology and disability access

Finding 5

The Committee finds that while positive advances have been made in Mobility as a Service and real-time transport management technologies, they do not always adequately account for differences in customer experience, such as for people with disability using wayfinding technology.

Recommendation 10

That Transport for NSW apply a whole-of-journey approach when developing transport technology and related applications to ensure equitable access for people with disability.

4.2 In March 2018, the NSW Government released its strategy for the Future Transport 2056, which sets out the 40-year vision, directions and principles, guiding transport investment over the longer term.[125] In particular, the strategy aims to improve accessibility for people with disability through advancements in technology, while continuing to engage and provide information through face-to-face methods and other means to remove barriers from transport networks.[126]

4.3 A key aspect of accessible transport technology is wayfinding solutions, such as integrated signage, maps, websites, apps, digital information systems and other communication channels. For example, it was noted that TfNSW had improved access for people with disability and impaired mobility through real-time planning management and trip planning apps, such as Trip Planner, Citymapper and Moovit. A smartcard has also been introduced to deliver a centralised booking service through an associated app for wheelchair-accessible taxis.[127]

4.4 Utilising connected and automated vehicle (CAV) technology can also assist people with disability and promote confidence in travelling independently.[128]

[125] NSW Government, Future Transport 2056, Reviewing our progress, viewed 26 November 2021

[126] NSW Government, Future Transport 2056, Six guiding principles: Accessible Services, viewed 26 November 2021

[127] Submission 15, NSW Government, p17

[128] Submission 11, ADVI, p12

4.5 While we recognise these are valuable initiatives to further develop technology and improve accessibility, we heard from Vision Australia that an increase in the overall complexity of the public transport infrastructure and the built environment has been challenging for people that are blind or have low vision.[129]

4.6 Vision Australia stated that there is a need for a whole-of-journey approach when considering accessibility, rather than simply connecting journeys. Failure at any point in the journey planning would cancel out any benefits elsewhere. For instance, if the first and last mile are accessible, but other aspects of the journey are not, then there is little practical value for a person that is blind or has low vision.[130] Bruce Maguire, Lead Policy Adviser, Government Relations and Advocacy, Vision Australia noted the importance of a whole-of-journey approach for people with disability:

> One of the things we mentioned in our submission is that you have to have a whole-of-journey approach, and there is no point having one part of a system accessible if the parts that you need to access that part are not accessible. If you cannot book a first or last mile service to get to a bus, for example, it does not matter if the bus is accessible because you cannot get to it. [131]

4.7 Wayfinding technology may also not always account for factors such as where it is difficult to physically access public transport or if an app becomes inaccessible due to lost signal during a person's journey. The Disability Council NSW held concerns about wayfinding apps that fail when signal is lost or where stops cannot be announced, unlike when a human driver is present.[132]

4.8 Specifically, it was noted that interactions with public transport staff can improve the confidence of people with disability using public transport. Casey Gray, Member of the Disability Council of NSW, reiterated the importance of having public transport staff on hand to provide reassurance for people with disability when travelling on public transport:

> There can be a whole lot of anxiety and confusion and things, not just for people with intellectual disability but maybe psychosocial disability and a whole range of things, at all points of the transport journey, so removing people from the equation really makes accessing transport really hard for a lot of people with disability.[133]

4.9 Jennifer Moon, Principal Adviser, Access and Engagement, Guide Dogs NSW/ACT echoed these concerns:

> We cannot take away people. People are the access link. When you have antiquated infrastructure, as we all know we have, human interaction can help bridge that inaccessibility to allow the person to continue on their journey.[134]

[129] Submission 14, Vision Australia, p2

[130] Submission 14, Vision Australia, p3

[131] Mr Bruce Maguire, Lead Policy Adviser, Government Relations and Advocacy, Vision Australia, Transcript of evidence, 15 October 2021, p17

[132] Ms Casey Gray, Member, Disability Council NSW, Transcript of evidence, 15 October 2021, p18

[133] Ms Gray, Transcript of evidence, 15 October 2021, p17

[134] Ms Jennifer Moon, Principal Adviser, Access and Stakeholder Engagement, Guide Dogs NSW/ACT, Transcript of evidence, 15 October 2021, p18

4.10 Ms Moon further noted that accessible technology must be aided by accessible infrastructure.[135]

4.11 The Disability Council NSW suggested that transport apps could be more user-friendly, especially for people with disability that may have low digital literacy.[136]

4.12 At the public hearing, TfNSW noted the importance placed on considering how people with disability would access new technologies:

> It is important to note that we are customer-led and problem-led, not technology-led; therefore, it is really all about starting with what the possible needs are. Before we introduce any new technology we need to understand that it is suitable for everyone who uses public transport, not just a cohort who might be digitally savvy.
>
> … Fundamentally, when we are looking at any type of technology, it is probably top of the list to understand how people who are less mobile or people who have disability will be able to interact with that.[137]

4.13 TfNSW further stated that it is committed to working with people with disability and all sections of the community to improve service delivery. For example, TfNSW indicated that the development of the Taxi Transport Subsidy Scheme and the rollout of a digital card are instances where it has implemented suggestions from disability advocacy groups. TfNSW has also invested in delivering some of its trip planning apps via digital channels that are voice activated, such as Google and Alexa, alongside customer contact centres to provide assistance with trip planning.[138]

Involving disability advocates in technology development

Recommendation 11

That Transport for NSW ensure that disability advocacy groups are involved at the consultation and planning stage for the development of transport technology to improve traveller access and safety, including journey planning.

4.14 We heard that there is a need for disability advocates to be involved in the consultation and planning stage of transport technology development to improve traveller access and safety for people with disability.

4.15 The NSW Disability Council emphasised it is important for people with disability to be involved in the design process from the outset because it makes it easier to have their voices heard and suggestions implemented, rather than disability features being considered as an afterthought:

> I think it is very important that people with disability are involved in design from the get-go, rather than retrofitting for safety after the fact. We find that once a design has been put together and we do provide feedback regarding safety, sometimes that

[135] Ms Jennifer Moon, Principal Adviser, Access and Stakeholder Engagement, Guide Dogs NSW/ACT, Transcript of evidence, 15 October 2021, p19

[136] Ms Gray, Member, Disability Council NSW, Transcript of evidence, 15 October 2021, p18

[137] Ms Wiblin, Transcript of evidence, 15 October 2021, pp33 – 34

[138] Mr Clark, Transcript of evidence, 15 October 2021, p33

> feedback is not valued. They do not see necessarily the dollar value in the feedback that we are providing, and so those safety features actually do not get incorporated into the retrofit. So design from the get-go, we need to be included in that design.[139]

4.16 Vision Australia provided evidence of some best practice examples in other jurisdictions, such as the European Union and United Kingdom:

> We know most about the work that is going on around acoustic vehicle alerting systems because that has become a global focus in the European Union, the United Kingdom, the United States and I think Japan and Canada as well as a United Nations standard. Those standards and guidelines have been developed through consultation with the disability community. For example, the sound that is used on the London electric buses that I mentioned earlier was developed in a trial involving, or consulting, organisations such as Guide Dogs for the blind and the Royal National Institute of Blind People.[140]

4.17 Ms Moon of Guide Dogs NSW/ACT also noted the value of the disability community providing contributions to the proposed e-scooter trials:

> I also make the comment now… applauding government because the trial that was done about the e-scooters, I was fortunate to be on the committee, and the fact that you had people in that committee with disability or representing people with disability, the issues were raised and it was a very robust discussion because it was obviously for and against having e-scooters on our streets. But we were really pleased that the safety elements or the risk elements, probably more to the point, were acknowledged and, as you are aware, the trial did not proceed. So knowing that around the world, perhaps as popular as those e-scooters are, they are also so problematic and everybody will report on the problems of them as well.[141]

4.18 We consider that, given the specific needs of people with disability to access public transport, and to do so in a way that fosters accessibility and independence, disability advocates should be involved in the design and development stage of transport technology development rather than being retrofitted at a later stage.

Improving pedestrian safety

Recommendation 12

That, in order to enhance pedestrian safety, Transport for NSW investigate whether restrictions should be placed on using e-scooters and e-bikes on footpaths, including whether speed limits should be implemented for these vehicles.

4.19 We heard concerns from disability advocates that smaller electric vehicles, such as e-bikes or e-scooters, could pose a safety risk for pedestrians who are blind or have low vision and may be unable to hear them approaching. This is especially where these smaller vehicles are also ridden on the footpath alongside pedestrians.

[139] Ms Gray, Transcript of evidence, 15 October 2021, p16

[140] Mr Maguire, Transcript of evidence, 15 October 2021, p16

[141] Ms Moon, Guide Dogs NSW/ACT, Transcript of evidence, 15 October 2021, p16

4.20 Guide Dogs NSW/ACT emphasised the importance of providing a safe environment for people who cannot see, especially in relation to shared zones.

> Just echoing Bruce's comments on the e-buses, e-scooters, e-vehicles: In footpath spaces, but shared zones as well, when cars are approaching, particularly from behind, you are not hearing that at all. If we are talking about connected automatic vehicles [CAVs] for the future, again a lot of the elements have not been discussed of how that would work for somebody who is blind or has low vision. So, again, good for the environment but we need to make sure they are safe and effective for people who cannot see.[142]

4.21 Vision Australia raised imposing speed limits on e-scooters or having a regulatory framework for registration and licensing for e-scooters as possible solutions. Specifically, Vision Australia asserted that there should not be vehicles travelling on footpaths at speeds faster than a person can walk and proposed a limit of 10 km per hour, compared to the 25 km per hour at which some e-scooters often travel.[143]

4.22 Visions Australia further advised that such high e-scooter speeds created a higher risk of serious injury, especially as their motors cannot be easily heard, and contributed to perceptions of danger among low vision or blind pedestrians. A recent survey conducted by Vision Australia among its members found that 60 per cent of responders had been in an accident or near accident with an e-scooter and 80 per cent no longer felt safe when on footpaths. Vision Australia also noted that further complications could arise from e-scooter injuries and any subsequent civil liability claims as there are no regulatory requirements around licencing of e-scooters.[144]

4.23 It was recommended that e-vehicles, including ordinary vehicles, CAVs or buses, must remain detectable and recognisable. Vision Australia noted that safety is the highest priority for people with disability, and that new technology must be introduced in a way that is safe.[145]

4.24 However, Bicycle NSW noted that the speed of an e-vehicle may be more of an infrastructure problem as there are no designated paths for e-scooters that are separate to the roads or footpaths. Ms Wallace, General Manager Public Affairs of Bicycle NSW, acknowledged that the National Transport Commission recommended that if 'micro-mobility devices were used on footpaths they be limited to 10 kilometres per hour, which would be consistent with mobility assistance devices for people with disabilities.'[146] Ms Wallace recommended that more research and education of riders be undertaken, rather than imposing speed limits:

> Education is definitely needed. At the moment we just have prohibition. We have prohibition of bicycles on footpaths, and we then have shared paths, bike lanes and

[142] Ms Moon, Transcript of evidence, 15 October 2021, p16

[143] Mr Maguire, Transcript of evidence, 15 October 2021, p20

[144] Mr Maguire, Transcript of evidence, 15 October 2021, pp19-20

[145] Mr Maguire, Transcript of evidence, 15 October 2021, p17

[146] Ms Wallace, Transcript of evidence, 15 October 2021, p23

> cycleways where people are allowed to cycle. Overall, yes, there could be education around safety behaviours, and Bicycle NSW does a great deal of that.[147]

4.25 TfNSW supported balancing the integration of micro mobility services in the community with the needs and concerns of the whole community, particularly for people who are less mobile and people with disability. TfNSW emphasised that community safety is a key component of their implementation strategy, which was why there was more time being taken in bringing micro-mobility services to the market in NSW:

> We know that there are concerns from a number of different cohorts in the community—people who are less mobile and people who have disabilities as well. For us, it is really important to measure the needs of all of the community members as we bring these technologies into the transport ecosystem.[148]

4.26 TfNSW has also undertaken research work with connected and automated vehicles (CAVs) and how that technology could assist people with disability or other challenges.[149] CAVs are discussed in more detail in Chapter 5.

[147] Ms Wallace, Transcript of evidence, 15 October 2021, p24

[148] Ms Wiblin, Transcript of evidence, 15 October 2021, p31

[149] Ms Wiblin, Transcript of evidence, 15 October 2021, p34

Chapter Five – Connected and Automated Vehicles

5.1 This chapter examines the recent work of Transport for NSW (TfNSW) with connected and automated vehicles (CAVs), the regulatory context of CAVs regarding NSW legislation and considerations for improved driver, passenger and pedestrian safety.

5.2 Connected vehicles use wireless technology to communicate with other vehicles, the road, other infrastructure and personal devices, using 4G and 5G networks, global navigation and satellite technologies.[150]

5.3 Automated vehicles refer to vehicles using technology such as robotics, sensors and advanced software to automate one or more elements of driving. For example, steering, accelerating or breaking.[151]

Recent work in CAVs

5.4 TfNSW has a particular focus on CAV technology for its ability to improve road safety, manage congestion, reduce household and business transport costs and improve connectivity of places.

5.5 As noted in Chapter 1, CAVs can be utilised to improve first and last mile journey connections to bolster MaaS offerings. Trials of CAV technology, in combination with public transport offerings, have taken place around NSW. For example, it was noted that TfNSW's trial of the automated 'Busbot shuttle' at the Marian Grove Retirement Village in Coffs Harbour to test their operation in a more complex environment and the ability of CAVs to address various mobility needs. The trial highlighted the mobility needs of older community residents and successfully linked an automated vehicle with an On Demand service for residents to book via an app. The trial also tested community acceptance of driverless connected vehicles, which found positive support among residents with Phase 2 of the trial seeing 2,500 passengers ride on 1,600 trips over 22 weeks.[152]

5.6 TfNSW also has an ongoing trial in Dubbo to develop an automated ute to 'assess the benefits and challenges of introducing CAVs in regional areas and under Australian conditions, including detection and avoidance of kangaroos on regional roads.'[153] The NSW Government also noted TfNSW's key Future Mobility testing facility at Cudal as part of its safety assurance approach:

> A key feature of TfNSW's safety assurance approach is the testing and assurance capability that is centred on the Future Mobility testing facility at Cudal. TfNSW will use this facility to support ANCAP testing to provide valuable safety advice to customers on new automated driver assist technologies embedded in new vehicles.

[150] NSW Government, Future Transport 2056, Connected and Automated Vehicles Plan, p18

[151] NSW Government, Future Transport 2056, Connected and Automated Vehicles Plan, p15

[152] Submission 15, NSW Government, p20

[153] Submission 15, NSW Government, p23

> Importantly, this facility is also providing local NSW capability to test and assure future vehicle technologies, particularly in a regional environment. This will be a critical facility for the future safety and assurance of CAV and related technologies.[154]

5.7 TfNSW has undertaken a number of initiatives involving CAVs and improving transport offerings:

(1) Smart Innovation Centre, which has been trialling highly automated and connected Smart Shuttles at Sydney Olympic Park integrated with traffic lights and digitals bus stops for turn-up-and-go shuttle services.

(2) Regional trials of highly automated shuttles in Armidale and Coffs Harbour, which has informed the use of automated vehicles on NSW roads and trialled integrating trip planners and on demand booking capability.

(3) Sydney Orbital Automated Vehicle Initiative, which conducted on-road trials of partially automated vehicles with seven major car manufacturers to analyse interactions between vehicles and road network infrastructure.[155]

5.8 CAV technology has also provided an opportunity for TfNSW to engage local research and develop local partnerships with service providers. Specifically, suppliers Easymile, Conigital, Navya, HMI Technologies, Motional and NVidia, as well as mobility service provides, VIA and Liftango. It was submitted that these TfNSW partnerships had highlighted the challenges of trialling and scaling the use of automated vehicles where industry leaders are not yet based in Australia and travel has been restricted by COVID-19. Therefore, a key focus for TfNSW is to 'reduce these barriers and build local capability through strategic partnerships, thought leadership, data sharing, co-investment, supportive policy, digital and physical infrastructure, testing facilities and community engagement.'[156]

5.9 TfNSW has also built key local partnerships with ADVI and iMOVE, which enable locally based research to approach transport-related challenges in the CAV and mobility sector. These TfNSW partnerships are aligned with NSW's economic development and innovation strategies, including:

(1) 20-Year Economic Vision for Regional NSW, which recognises the opportunities in digital disruption and entrepreneurship in regional areas.

(2) NSW Innovation Strategy, which aims to boost innovation, stimulate economic activity and drive shared prosperity, including support for the knowledge economy and entrepreneurs.

(3) Jobs for the Future, to nurture growth in start-ups and digital innovation, and to skill up for the knowledge economy.

[154] Submission 15, NSW Government, p23

[155] Submission 15, NSW Government, p21

[156] Submission 15, NSW Government, p22

(4) Trade and Investment Action Plan, which includes strengthening NSW's economy by leveraging the transport technology sector.[157]

5.10 At the public hearing, TfNSW explained that CAVs collect different datasets such as location data and the behaviour and performance of the vehicle to assist in understanding safety outcomes. It stated that the privacy and security around such datasets is treated in the same manner as other confidential data collected by NSW Government agencies in cooperation with the NSW Privacy Commissioner.[158] More detail on the privacy and security of data is discussed in Chapter 2.

CAVs, the regulatory context and ethical considerations

Recommendation 13

That Transport for NSW examine the regulatory and policy implications of connected and automated vehicles for personal injury liability and develop a plan to address any shortcomings in the current regulatory framework.

5.11 While CAVs offer significant benefits of convenience and improved safety functions, we heard that it is important that these vehicles are adequately accounted for by the regulatory and policy framework to adequately protect and support people who have been injured following an accident involving a CAV.

5.12 Given the heavily automated safety features of CAVs, it is imperative that these devices go through the appropriate safety assurance processes. This is even more pronounced in the context of potential road accidents involving CAVs, as concerns were raised that the current legal and regulatory framework does not adequately account for motor accident injuries involving CAVs. We consider it important that all road users are accounted for in the regulatory and policy framework involving CAVs and that any gaps in protection should be examined and addressed.

5.13 Maurice Blackburn Lawyers identified core principles that they believe are important when considering CAV technology. Firstly, they considered that road safety technology should be accompanied by robust regulation:

> … any automated technology that improves road safety should be encouraged - but not without robust regulation that protects road users, particularly vulnerable road users. For example, we consider it particularly important that regulation is in place to ensure personal injury insurance coverage applies equally to an individual who is injured in a CAV or in a human driven vehicle - and that this regulation is in place before the technology is rolled out.

5.14 Maurice Blackburn further submitted that a whole of life approach be taken to CAV technology:

> … safety assurance processes must be robust enough to ensure that a CAV is safe when it enters the market, and to ensure that it continues to be safe until the end of its working life.[159]

[157] Submission 15, NSW Government, p22

[158] Ms Wiblin, Transcript of evidence, 15 October 2021, p30; Mr Clark, Transcript of evidence, 15 October 2021, p31

[159] Submission 9, Maurice Blackburn Lawyers, p2

5.15 Maurice Blackburn emphasised in their submission that 'the primary ethical consideration in the introduction of CAVs should be that no person should be worse off, financially or procedurally, if they are injured by a vehicle whose ADS was engaged, than if they were injured by a vehicle controlled by a human driver.'[160]

5.16 At the public hearing, Maurice Blackburn elaborated on these concerns and that current case law regarding personal injury by vehicles refers to *human drivers*, rather than *automated driving vehicles* which may present problems when seeking personal injury compensation and insurance coverage:

> It is assumed that the driver—a lot of the case law that explored that point certainly defined "driver" to be a human driver and it became very apparent that that was not necessarily broad enough to capture when an automated driving system is driving the vehicle, even when a feature might be engaged like autonomous emergency breaking or lane keep assist. Some of the features that were in on-road models today could be interpreted that that is the car doing the work of the driving and not the human. What that would mean would be a completely inequitable system where, if I am a pedestrian walking across the road, if I got a hit by a car driven by a human driver I would have my full insurance entitlements under my State and Territory compulsory third party scheme and be protected. If I were hit by a car that had autonomous emergency breaking engaged, and the human driver did not put their foot down on the brake pedal, that very slight difference from a technical legal perspective might mean I have no coverage and I have to rely on Medicare and I would have completely different entitlements to the person who had been hit by the human putting their foot on the brake pedal.[161]

5.17 Maurice Blackburn also drew our attention to the work of the National Transport Commission (NTC) on this issue, which is the lead Australian government body for land transport reform to improve safety, productivity, environmental outcomes and regulatory efficiency.[162] Maurice Blackburn stated that the NTC had received assurances 'from State and Territory governments that the coverage would be equal.' However, it was emphasised that this should be enshrined in legislation to ensure proper protection.[163] This is particularly the case where civil claims are involved, for example, against a manufacturer or software provider of a CAV involved in a crash. [164]

5.18 This issue of consistency was raised in other jurisdictions. For example, the US has a State-based legislative approach, rather than a unified federal approach, with many personal injury claims being dealt with on a case-by-case basis or being settled out of court which limits how precedents for future cases are developed.[165]

[160] Submission 9, Maurice Blackburn, p2

[161] Ms Minogue, Transcript of evidence, 15 October 2021, p27

[162] National Transport Commission, What we are doing, viewed 22 November 2021

[163] Ms Minogue, Transcript of evidence, 15 October 2021, p27

[164] Ms Minogue, Transcript of evidence, 15 October 2021, p27

[165] Ms Minogue, Transcript of evidence, 15 October 2021, pp27-28

5.19 On this point, Ms Minogue noted that Australia's legal system has taken a more measured approach, but we must still be proactive when it comes to legislating for CAVs:

> …we have a very measured, good, strong, common law system for bringing civil claims. I think it is just making sure that autonomous vehicles, and the parties responsible for them as they are rolled out, as they take over more of the driving task and that becomes potentially a bigger liability aspect, we want to make sure that we have got some good regulation in place that holds them to account from a safety perspective, but the balance is that we also have a common law system that supports holding them to account if they are negligent or they do something wrong. I think we are finding that good balance by looking overseas and seeing how they are doing it and developing our own path with that measured balanced approach.[166]

5.20 While Maurice Blackburn stated that Australia does not have a uniform national approach to CAV regulation, it noted the work of the NTC regarding the ethical considerations required for the safe introduction of CAVs.[167]

5.21 In their submission, the NSW Government stated that TfNSW have created a clear legislative framework in NSW to test and trial a wide range of CAV uses under strict safety controls:

> This safety assurance framework continues to be improved to support further trials and proposed initiatives, and TfNSW is working closely with the Australian Government and other jurisdictions to align and inform the national regulatory approach. This will ensure that NSW is on the front-foot with emerging technologies, while balancing all necessary ethical and regulatory considerations in the adoption of such new technology.[168]

5.22 While TfNSW's evidence to this inquiry did not expressly discuss any potential issue of personal injury claims caused by CAVs, the Future Transport 2056 strategy lists laws and safety as a priority area for their CAV Plan. The NSW Government further noted its commitment to work with the Australian Government, the NTC and other jurisdictions on a unified approach to CAV regulation:

> Our priority is to work with the Australian Government to establish regulations to support the safe adoption and use of CAVs. The regulatory framework will need to be consistently applied across Australia and flexible enough to remain effective during the complex transition to a CAV future.
>
> We are working with the Australian Government, the National Transport Commission (NTC) and other jurisdictions to put in place harmonised national laws and policies for CAVs, including to assure their safety.[169]

5.23 In November 2017, national Transport Ministers agreed to have a national end-to-end regulatory framework in place by 2020 (subject to change at Ministerial discretion) to support safe, commercial deployment and operation of automated

[166] Ms Minogue, Transcript of evidence, 15 October 2021, p28

[167] Submission 9, Maurice Blackburn Lawyers, p1

[168] Submission 15, NSW Government, p19

[169] NSW Government, Future Transport 2056 strategy, Connected and Automated Vehicles Plan, Priority 1: Laws and Safety, viewed 22 November 2021.

vehicles at all levels of automation. It was also agreed to develop a national safety assurance system for automated vehicles, based on mandatory self-certification, transitioning to pre-market approval when international standards for automated vehicles are incorporated into Australian laws and standards.[170]

5.24 Ministers agreed in November 2018 on the safety conditions for vehicles with automated driving systems upon entry into the market. This reform builds on that decision to ensure these vehicles continue to operate safely throughout their life on the road. In 2020, Australian Transport ministers agreed to work towards establishing a national approach to regulating automated vehicles (AVs) when they are commercially deployed on our roads.[171]

CAVs and pedestrian, bicycle, and motorbike safety

Recommendation 14

That Transport for NSW prioritise pedestrian detection and safety in the development of connected and automated vehicle technology, rules and regulations.

5.25 During the inquiry, stakeholders raised concerns about CAVs and their programming for pedestrian detection, particularly involving people with disability that may use a walking cane or guide dog.

5.26 Bruce Maguire of Vision Australia stated that safety is paramount when introducing new technology, especially to ensure that they are able to be detected by people who have low vision or are blind. Additionally, interface design may also need to be considered in light of accessibility needs:

> We do have to consider the accessibility of the interfaces and the various elements involved in the transport technology, and things like if you are going to use connected autonomous vehicles how is a person going to interact with that vehicle? If a vehicle turns up at your house, for example, how do you know, if you are blind or have low vision, that it is there? How do you know how to get into it and what to do when you are in it? These are design elements, and once the design elements are taken care of I think a lot of the deployment issues will become easier to deal with. It is those key design elements—safety, accessibility, inclusion and consultation— that I think are really key so they would be at the top of our priority list.[172]

5.27 Similarly, there was concern over how electric vehicles, including CAVs, will remain detectable to people who have low vision or are blind. This was discussed in more detail in Chapter 3.

5.28 As also noted in Chapter 2, concerns were raised regarding the detection of bicycles, motorcycles and scooters by CAVs, particularly as bicycles and motorbikes do not necessarily drive in a straight line and CAV safety systems are based on

[170] NSW Government, Future Transport 2056 strategy, Connected and Automated Vehicles Plan, Priority 1: Laws and Safety, viewed 22 November 2021.

[171] National Transport Commission, Ministers agree on a national approach to regulate AVs, 19 June 2021

[172] Mr Maguire, Transcript of evidence, 15 October 2021, p17

detecting a sedan. Mr Kevin Henry of the Motorcycle Council of NSW raised concerns about CAV detection and how that may impact other road users:

> We often have movement with wind, road conditions and obstacles. Similarly pushbikes, when they assert pressure to go up hills and down hills, cannot travel in a dead straight line. Many of the systems do not recognise that moving object. Those are some of our objections. It is basically our safety. We do not feel that the safety should be put on the motorcyclist; it should be put on the major vehicles. …[I]f there is a failure then it is always the vulnerable road user—pedestrian, wheelchair, motorcycle, pushbike—that pays the cost. In an interaction between a vehicle and one of us it often includes injury and pain, whereas between two vehicles it simply can be, in a mild manner, just damage.[173]

5.29 Bicycle NSW echoed these sentiments and noted concerns that automated technology did not take into account the proper detection of smaller road users like motorcycles and bicycles:

> … Bicycle NSW is represented on the Construction Logistics and Community Safety Scheme [CLOCS]—a committee for the introduction of construction and logistic safety standards into Australia that is similar to overseas. We would also cite that the algorithms even in the best of heavy vehicles currently are based around detecting a sedan. When I asked the technical experts about whether or not those algorithms could detect motorbikes or bicycles the answer was no. I think it is incredibly important when we talk technology systems that we really ensure that the technology systems we introduce into the State of New South Wales and that we allow to operate in our jurisdiction actually perceives and plans for the needs of all users of the road-related environment, that is, bicycles, motorcycles, pedestrians and, at times, in rural and regional New South Wales too often horse riders and livestock are ignored as well. We really need to actually plan for everybody who uses our roads.[174]

5.30 The Australia and New Zealand Driverless Vehicle Initiative (ADVI) noted that while Australia has expertise in testing and implementing CAV technology, Australia currently only receives automated driving technology and has little opportunity to develop its own ethical programming:

> The key barrier to understanding the ethics and how to regulate the introduction of automated vehicles, is that we are unable to test how the systems have been programmed to respond to situations in an Australian context. The absence of uniquely Australian datasets for testing and certifying automated driving systems is seen to be a significant gap. ADVI through our partnership network are actively seeking to address this gap.[175]

5.31 However, ADVI also highlighted that the future of automated technology offered opportunities for increased mobility of those who may not be currently able to drive, such as those who are vision impaired, ageing, living with a disability, or have a medical condition that precludes them from owning a driver's licence. ADVI noted their support for including people with disability in the planning process for the development of driverless vehicle technology:

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[173] Mr Henry, Transcript of evidence, 15 October 2021, p24

[174] Ms Wallace, Transcript of evidence, 15 October 2021, p24

[175] Submission 11, ADVI, pp11-12

> Ethical considerations of addressing the current transport disadvantage for people living with a disability must be prioritised higher than is currently the case. ADVI is working with key interest groups to ensure that people living with a disability are not excluded in the planning and development of driverless technology and regulation in Australia. In 2020 ADVI released a thought leadership paper that highlighted the current gaps that we expect automated vehicles to fill, to deliver the road to independence for people living with a disability.[176]

5.32 The NSW Government acknowledged the importance of hearing and understanding customers' preferences and that TfNSW actively seeks to respond to customer-raised concerns and feedback:

> When developing new technologies, TfNSW engages with customers and uses human centred design to make sure the vast needs of various customers are addressed. Through voice-of-the-customer data and regular customer satisfaction surveys, TfNSW also tracks the value that customers put on considerations like access, safety, convenient information and payments. These customer technologies and insights help improve services by providing planners and network managers with data on transport use and insights about customers' preferences.[177]

5.33 We consider that TfNSW should prioritise pedestrian detection and safety in the further development of CAV technology, rules and regulations.

[176] Submission 11, ADVI, p12

[177] Submission 15, NSW Government, p16

Appendix One – Terms of reference

The Committee will inquire into how local research and development in the transport technology sector can deliver transport service innovations, including:

1. Mobility as a Service (MaaS)
2. real time public transport journey management
3. first and last mile transport services
4. how data might be used to improve access and safety for travellers, including for women, and
5. the ethical considerations and regulations in the development of connected and automated vehicles (CAVs).

Appendix Two – Conduct of inquiry

Adopting terms of reference

On 1 April 2021 the Committee resolved to inquire into and report on how local research and development in the transport technology sector can deliver transport service innovations including:

- Mobility as a Service (MaaS)
- real time public transport journey management
- first and last mile transport services
- how data might be used to improve access and safety for travellers, including for women, and
- the ethical considerations and regulations in the development of connected and automated vehicles (CAVs).

The terms of reference for the inquiry are at Appendix one.

Call for submissions

The Committee called for submissions through a media release and wrote to key stakeholders inviting them to make a submission.

Information about the inquiry was posted on the Legislative Assembly's Facebook page and Twitter feed.

Submissions closed on 28 May 2021.

Fifteen submissions were received from the community, technology companies, research bodies, disability advocate organisations, interest groups and Transport for NSW.

A list of submissions is at Appendix three.

Submissions are available on the Committee website.

Hearings

The Committee held one hearing at Parliament House on 15 October 2021 with witnesses representing transport technology companies, research centres, transport interest groups, disability advocacy and support groups, and Transport for NSW.

Appendix four is a list of witnesses who appeared at the hearings.

Transcript of evidence taken at the hearing is on the Committee webpage.

Appendix Three – Submissions

No.	Author
1	Name suppressed
2	Mr Tony Robinson
3	Motorcycle Council of NSW
4	Lynxx
5	She's A Crowd
6	Bicycle NSW
7	iMOVE Australia Ltd
8	The SMART Infrastructure Facility
9	Maurice Blackburn Lawyers
10	Transdev Australasia
11	The Australia and New Zealand Driverless Vehicle Initiative (ADVI)
12	Guide Dogs NSW & ACT
13	Via
14	Vision Australia
15	NSW Government

Appendix Four – Witnesses

15 October 2021 – Jubilee room, Parliament House Sydney, NSW and via video conference

Witness	Position and Organisation
Mr David Le Breton	Head of Mobility, Transdev Australia
Ms Rita Excell	Executive Director, Australia New Zealand Driverless Vehicle Initiative
Mr Ian Christensen	Managing Director, iMOVE Australia
Mr Matt McInnes	Managing Director, Lynxx
Ms Zoe Condliffe	CEO and Founder, She's A Crowd
Mr Johan Barthelemy	Chief Investigator, The SMART Infrastructure Facility
Ms Jennifer Moon	Principal Adviser, Access and Stakeholder Engagement, Guide Dogs NSW/ACT
Ms Casey Gray	Member, Disability Council NSW
Mr Bruce Maguire	Lead Policy Adviser, Government Relations and Advocacy, Vision Australia
Ms Bastien Wallace	General Manager Public Affairs, Bicycle NSW
Mr Kevin Henry	Chairman, Motorcycle Council of NSW
Ms Katie Minogue	Principal Lawyer, Maurice Blackburn Lawyers
Ms Sue Wiblin	Executive Director Emerging Technologies, Customer Strategy and Technology, Transport for NSW
Mr Lewis Clark	Acting Head of Technology and Innovation, Customer Strategy and Technology, Transport for NSW

Appendix Five – Extracts from minutes

MINUTES OF MEETING No 8
12 noon, 1 April 2020
Room 1254

Members present (via Webex)
Ms Preston, Mr Singh, Ms Petinos, Dr O'Neill, Mr Minns

Officers in attendance
Elaine Schofield, Cheryl Samuels, Ze Nan Ma, Mohini Mehta

1. Confirmation of minutes

Resolved on the motion of Mr Singh, seconded Ms Petinos: That the minutes of the meeting of 23 September 2020 be confirmed.

2. ***

3. Discussion about options for future inquiry

i. ***

ii. Proposed inquiry into the transport technology sector

Resolved on the motion of Ms Petinos, seconded Mr Singh : That the Committee conduct an inquiry into the transport technology sector with the following terms of reference:

The Committee will inquire into how local research and development in the transport technology sector can deliver transport service innovations, including:

1. Mobility as a Service (MaaS)
2. real time public transport journey management
3. first and last mile transport services
4. how data might be used to improve access and safety for travellers, including for women, and
5. the ethical considerations and regulations in the development of connected and automated vehicles (CAVs).

4. ***

5. Next meeting

The meeting adjourned at 12:12 pm until a date to be confirmed.

MINUTES OF MEETING No 9
2:19pm, Monday 24 May 2021
Online via Webex, and Room 1254, Parliament House

Members present
Ms Preston (Chair, in person), Mr Singh (Deputy Chair, via Webex), Ms Petinos (via Webex), Dr O'Neill (via Webex)

Officers in attendance
Elaine Schofield, Caroline Hopley, Aaron Willey, and Mohini Mehta
Apologies
Mr Minns

1. **Confirmation of minutes**
   Resolved, on the motion of Mr Singh, seconded Dr O'Neill: That the minutes of the meeting of 1 April 2021 be confirmed.
2. **Inquiry into the transport technology sector**

   2.1 Private briefing from Transport for NSW on issues relevant to the inquiry.

   Resolved, on the motion of Mr Singh, seconded Dr O'Neill: That the Committee invite the following officials from Transport for NSW to brief the Committee on issues relevant to the inquiry:

   - Lewis Clark – A/Head of Technology and Innovation, Customer Strategy and Technology
   - John Paul Ahern – Executive Director, Intelligent Systems, Technology and Innovation
   - Evan Walker – Director, Future Mobility, Technology and Innovation

   The Committee noted the attendance of the following observers from Transport for NSW:

   - Dominique Winn – Technology and Innovation
   - Anju Sharma – A/Manager, Parliamentary and Government Services

3. **Next meeting**
   The meeting adjourned at 2:20pm until a date and time to be confirmed.

MINUTES OF MEETING No 10
12:05pm Monday 20 September 2021
Via Webex

Members present
Ms Preston (Chair), Mr Singh (Deputy Chair), Ms Petinos, Dr O'Neill, and Ms Haylen

Officers in attendance
Sam Griffith, Caroline Hopley, Ze Nan, and Mohini Mehta

1. **Apologies**

Mr Minns
2. **Confirmation of minutes**

Resolved on the motion of Ms Petinos: That the minutes of the meeting of 24 May 2021 be confirmed.

3. Correspondence

The Committee noted the following correspondence:

(a) 13 September 2021 – Letter received from Mr Chris Minns MP notifying the Chair of his unavailability for the meeting of 16 September 2021 and nominating Ms Jo Haylen as his substitute pursuant to standing order 273A(2).
(b) 17 September 2021 – Letter received from Mr Chris Minns MP notifying the Chair of his unavailability for the meeting of 20 September 2021 and nominating Ms Jo Haylen as his substitute pursuant to standing order 273A(2).

The Chair welcomed Ms Haylen to the meeting.

4. Inquiry into the transport technology sector

4.1 Briefing note on inquiry topics

The Committee noted a briefing note prepared by the secretariat on inquiry topics has been circulated to members.

4.2 Submissions and publication table

The Committee considered the publication of Submissions 1 to 15.

As a matter of practice, the committee noted that details such as residential addresses, phone numbers and email addresses will be redacted from submissions. Signatures will also be redacted.

Resolved on the motion of Ms Petinos: That the Committee authorise publication in full of submission 2 to 15.

Resolved on the motion of Ms Haylen, seconded by Mr Singh: That the Committee authorise the partial publication, with the name supressed, of submission 1.

4.3 Hearing dates and witness selection

The Committee discussed potential dates to hold a public hearing and witness selection.

Resolved on the motion of Ms Petinos: That the committee staff contact members regarding their availability for possible hearing dates in the month of October and for witness nominations.

5. General business

None

6. Next meeting

The Committee adjourned at 12.15pm until a date and time to be determined.

MINUTES OF MEETING No. 11
15 October 2021
9:23am, Jubilee Room, Parliament House and Webex videoconference

Members Present:
Ms Robyn Preston (Chair), Mr Gurmesh Singh (Deputy Chair), Ms Jo Haylen, Dr Marjorie O'Neill, Ms Eleni Petinos

Officers in attendance:
Mr Sam Griffith, Ms Clara Hawker, Ms Caroline Hopley, Ms Imogen Wurf, Mr Ze Nan Ma, Ms Mohini Mehta.

1. Apologies
Nil

2. Membership change
The Committee noted the appointment of Ms Jo Haylen MP to the committee and the discharge of Chris Minns MP (see extracts from votes and Proceedings No 105 dated 12 October 2021).

3. Confirmation of minutes
Resolved, on the motion of Mr Singh, seconded by Dr O'Neill: That the minutes of the meeting No. 10 of 20 September 2021 be confirmed.

4. Correspondence
The Committee noted the following correspondence:

Received:

- 1 October 2021 – Email received from Andrew Small, Policy Lawyer, Law Society of NSW, declining the Committee's invitation to attend the public hearing of 15 October 2021.
- 6 October 2021 – Letter received from Chris Minns MP notifying the Chair of his unavailability for the meeting and public hearing of 15 October 2021 and nominating Ms Jo Haylen as his substitute pursuant to standing order 273A(2).
- 7 October 2021 – Email received from Alastair McConnachie, Deputy Executive Director, NSW Bar Association, declining the Committee's invitation to attend the public hearing of 15 October 2021.

5. Inquiry into the transport technology sector

5.1 Public hearing
The Committee noted that the public hearing will commence at 9:30am.

The Committee noted that the hearing schedule and suggested questions for the witnesses were distributed to members.

5.2 Procedural Resolutions
Resolved, on the motion of Mr Singh, seconded by Dr O'Neill:

a) That the Committee authorises the audio-visual recording, photography and broadcasting of the public hearing on 15 October 2021 in accordance with the

NSW Legislative Assembly's guidelines for coverage of proceedings for parliamentary committees administered by the Legislative assembly.

b) That the corrected transcripts of evidence given on 15 October 2021 be authorised for publication and uploaded on the Committee's website.
c) That witnesses be requested to return answers to questions taken on notice within 21 days of the date on which the questions are forwarded, and that once received, answers be published on the Committee's website.
d) That the documents tendering during the public hearing be accepted by the Committee and published on the Committee's website.

5.3 Hybrid Hearing Guidelines

The Committee noted the guidelines for conducting a COVID-safe public hearing.

The Chair adjourned the deliberative meeting at 9:29am

6. Public Hearing: Transport Technology Sector

The public hearing was broadcast via the Parliament's webcast.

The public hearing commenced at 9.30 am and the Chair made a short opening statement.

At 9:32am, the following witnesses were admitted:

- Mr David Le Breton, Head of Mobility, Transdev Australia, Transdev Australasia, sworn and examined.
- Ms Rita Excell, Executive Director, Australia New Zealand Driverless Vehicle Initiative (ADVI), sworn and examined.
- Mr Ian Christensen, Managing Director, iMOVE Australia Ltd, affirmed and examined.
- Mr Matt McInnes, Managing Director, Lynxx Asia Pacific, affirmed and examined.

Evidence concluded, the witnesses withdrew.

Mr Singh left the hearing at 10:30am and re-entered the hearing at 10:56am.

At 10:44am, the following witnesses were admitted:

- Ms Zoe Condliffe, CEO and Founder, She's A Crowd, affirmed and examined.
- Dr Johan Barthelemy, Chief Investigator and Lecturer, the SMART Infrastructure Facility, sworn and examined.

Evidence concluded, the witnesses withdrew.

At 11:30am, the following witnesses were admitted:

- Ms Jennifer Moon, Principal Advisor, Access and Stakeholder Engagement, Guide Dogs NSW & ACT, affirmed and examined.
- Ms Casey Gray, Member, Disability Council NSW, affirmed and examined.
- Mr Bruce Maguire, Lead Policy Advisor, Government Relations and Advocacy, Vision Australia, affirmed and examined.

Ms Petinos arrived at 11:20am

Evidence concluded, the witnesses withdrew.

At 12:17pm, the following witnesses were admitted:

- Ms Bastien Wallace, General Manager Public Affairs, Bicycle NSW, affirmed and examined.
- Mr Kevin Henry, Chairman, Motorcycle Council of NSW, affirmed and examined.

Evidence concluded, the witnesses withdrew.

At 1:48pm, the following witness was admitted:

- Ms Katie Minogue, Principle Lawyer, Maurice Blackburn Lawyers, affirmed and examined.

Evidence concluded, the witness withdrew.

Dr O'Neill withdrew from the hearing.

At 2:25pm following witnesses representing Transport of NSW were admitted:

- Ms Sue Wilbin, Executive Director Emerging Technologies, Customer Strategy & Technology, sworn and examined.
- Mr Lewis Clark, Acting Head of Technology and Innovation, Customer Strategy & Technology, sworn and examined.

Evidence concluded, the witnesses withdrew.

At 3:21pm, the Chair closed the public hearing.

At 3:23pm, the Chair reopened the deliberative meeting.

7. General Business

Resolved on the motion of Ms Petinos, seconded by Mr Singh: That witnesses be requested to return answers to additional questions within 21 days of the date on which the questions are forwarded, and that once received, answers be published on the Committee's website.

8. Next meeting

The Committee adjourned at 3:29pm until a time and date to be set.

UNCONFIRMED MINUTES OF MEETING No. 12

9 December 2021
8:03am, Room 1254, Parliament House and Webex videoconference

Members Present:

Ms Robyn Preston (Chair), Mr Gurmesh Singh (Deputy Chair), Ms Jo Haylen, Dr Marjorie O'Neill, Ms Eleni Petinos *(all members via videoconference)*

Officers in attendance:
Mr Sam Griffith, Ms Caroline Hopley, Ms Imogen Wurf, Ms Nicolle Gill

1. Apologies
Nil

2. Confirmation of minutes
Resolved, on the motion of Ms Petinos, seconded by Dr O'Neill: That the minutes of the meeting of 15 October 2021 be confirmed.

3. Inquiry into the Transport Technology Sector

3.1 Answers to questions on notice received
The Committee noted answers to questions on notice received from Transport for NSW and their publication on the Committee's website, as resolved at the meeting of 15 October 2021.

3.2 Consideration of Chair's draft report
Resolved, on the motion of Mr Singh, seconded Dr O'Neill: That the draft report be considered chapter by chapter.

Chapter 1
The Chair proposed that Chapter 1 stand as part of the report.

Resolved on the motion of Mr Singh: That Chapter 1 stand as part of the report.

Chapter 2
The Chair proposed that Chapter 2 stand as part of the report.

Resolved on the motion of Mr Singh: That Chapter 2 stand as part of the report.

Chapter 3
The Chair proposed that Chapter 3 stand as part of the report.

Dr O'Neill moved at paragraph 3.18: That the text 'Ms Condliffe remarked that this last point on staffing presents an issue when considering the role of automated, driverless vehicles in the future.' be omitted and the following text be inserted:

3.19 She's A Crowd indicated that women they had surveyed 'do not believe that ticketing staff are trained appropriately to respond to disclosures or to look for gendered elements of violence' and wanted to see the return of conductors.

3.20 Ms Condliffe explained how automation has reduced the physical presence of staff, and that this has caused 'increased feelings of unsafety while travelling' for many women. Ms Condliffe remarked that in light of this evidence, staffing presents an issue when considering the role of automated, driverless vehicles in the future.

Discussion ensued.

Question put.

The question was resolved in the affirmative.

The Chair again proposed that Chapter 3, as amended, stand as part of the report.

Resolved on the motion of Dr O'Neill: That Chapter 3 as amended stand as part of the report.

Chapter 4
The Chair proposed that Chapter 4 stand as part of the report.

Resolved on the motion of Mr Singh: That Chapter 4 stand as part of the report.

Chapter 5
The Chair proposed that Chapter 5 stand as part of the report.

Resolved on the motion of Mr Singh: That chapter 5 stand as part of the report.

Appendices
The Chair proposed that the Appendices stand as part of the report.

Resolved on the motion of Mr Singh: That the Appendices stand as part of the report

Adoption and report tabling
Resolved, on the motion of Ms Petinos, seconded by Mr Singh:

1. That the draft report, as amended, be the report of the Committee, and that it be signed by the Chair and presented to the House;

2. That the Chair and Committee staff be permitted to correct stylistic, typographical, grammatical and consequential errors;

3. That once tabled, the report be posted on the Committee's website; and

4. That the Chair issue a media release announcing the tabling of the Committee's report.

4. General Business
The Committee noted their thanks to the secretariat for their work on the report.

The Chair discussed with the Committee that the next meeting may be held on Tuesday 15 February 2022 at 1:30pm subject to member availability.

5. Next meeting
The Committee adjourned at 8:14am until a time and date to be set.