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Barriers towards enhancing mobility through MaaS in a Regional and Rural context: insights from suppliers and organisers

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ABSTRACT: This study explores the potential of a mobility framework for MaaS in a regional and rural context. In-depth interviews of stakeholders, including Non-Transport Providers and Transport Providers, were conducted in three regional locations in New South Wales, Australia, and their attitudes towards MaaS analysed. Findings revealed that the majority had a positive attitude towards MaaS; while those who expressed negative attitudes commonly had concerns about subscription fees, the underlying reliance on private cars in rural areas, and the digital usage by older people. The paper discusses the government's role in improving travel options which ensure equitable access to both local and regional transport services. Policy implications for necessary adjustments to the modal landscape and the design of a digital App and payment methods are drawn. The results provide insights into the features of mobility services, which could include alternative uses for the private car, provided by various stakeholders and their fit within the mobility framework.

KEY WORDS: *Mobility-as-a-Service, Rural MaaS, In-depth stakeholder interviews, Transport/Non-Transport service providers*

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1. Introduction

While the concept of Mobility as a Service (MaaS) has gained popularity in urban areas as a means of providing customers with a one-stop platform to access transport information, book and pay for various mobility services, it has not received much attention in regional and rural contexts, even though these are areas where users often face the greatest challenges in accessing mobility services. Regional and rural areas are typically characterised by lower population densities, dispersed settlements, and limited public transport infrastructure. Prior research indicates that the lack of accessible public transport services significantly hinders individuals' access to essential activities, such as healthcare, education, and employment (Iezzoni et al., 2006; Remillard et al., 2022). Limited access to transport services has resulted in reduced economic opportunities and increased social exclusion. In many Western cultures, there has been a growth in car use and non-urban bus use has been in decline across all ages for several decades (Mackett, 2018). Australia is an affluent but low-density country with very high vehicle ownership levels and limited public transport in rural areas. To understand the challenges to improving mobility options in rural areas for those without a car, Jesus (2023) investigated three fundamental questions regarding rural car access, including the extent and scale of vehicle access, the mobility and accessibility challenges faced by carless households, and the adaptations made by rural households to cope without a private car. Jesus reveals that a significant proportion of residents in rural areas, who are carless or live in car-deficit households, find car ownership costs prohibitive and face limited public transport options, thus expressing a preference for improved personal transportation without the burden of private car ownership.

Rural MaaS has emerged as a potential solution to the mobility barriers faced by users, as it offers the possibility of integrating various travel options in a way that may reduce social exclusion and promote economic development. Notwithstanding the potential benefits of MaaS, the definition and key elements of 'Rural MaaS' are still evolving (discussed in section 2). Thus, it is crucial to adopt a comprehensive approach to fully understand the significant barriers and enablers to MaaS implementation. To achieve this, this study conducted in-depth interviews with multiple stakeholders in three regional locations in New South Wales (NSW), Australia, to identify the barriers of implementing MaaS in a regional and rural context. By speaking with transport providers, government agencies, health and aged care organizations, and First Nation groups, the research aims to understand barriers not just from a transport perspective but also from socio-cultural, economic, and governance perspectives. The interviews were structured to uncover new barriers and enablers, with a focus on identifying patterns and commonalities among responses in the analysis. This was instrumental in revealing the need for tailored MaaS solutions, especially in a regional and rural context.

The rest of the paper is organised as follows. Section 2 reviews the literature context and identifies our contribution. Section 3 introduces the methods of the study while Section 4 presents the results of qualitative analysis from in-depth interviews. Section 5 discusses the policy implications and Section 6 concludes the paper with suggestions for future research.

2. Literature context

This section reviews relevant literature related to the definition and key elements of Rural MaaS, barriers to operating mobility services in regional and rural areas and positions the contribution of this paper.

2.1 Definition and key success factors of "Regional and Rural MaaS"

Rural MaaS has attracted attention in the literature only relatively recently. A key definition was proposed by Eckhardt et al. (2020), as follows "*mobility of people and goods on a one-stop-shop principle consisting of various user groups and integrated transport services*". However, as accessibility and reducing transport disadvantage are key concerns in rural areas this definition is somewhat narrow as Rural MaaS must combine different services and user groups rather than just

concentrate on modes if it is to be successful. Hensher et al. (2022) highlighted the need to prioritise cars as potential shared community vehicles over public transport in MaaS systems in a regional and rural setting. Mulley et al. (2023) indicated that long-distance public transport remains fundamental in regional and remote areas and is anticipated to serve as an essential element of the MaaS offer, with car-based solutions becoming more prominent.

The World Economic Forum (2021) identified several key success factors (KSFs) based on MaaS implemented in rural and regional Japan, including user-oriented services, customisation, repeated use (on account of ease), revenue improvement, seamless use, improvement of transport within the region, motivating people to move by providing destinations, and collaboration with other sectors. Experience from Japan offers a checklist for future MaaS providers to build a business model customised to their regions and helping those already operating MaaS businesses to identify areas for improvement. Leung et al. (2023) examined MaaS applications in tourism across Finland, Japan, and Taiwan, and its potential in three regional cities in Queensland, Australia. Whilst their study is based on regional cities and does not consider rural areas *per se*, the findings are relevant to regional contexts. Their SWOT analysis showed that MaaS thrives in areas with diverse economies and growing tourist attractions, emphasising the need for integrated transport modes and additional services like accommodation and events, which we refer to as multi-service MaaS.

2.2 Barriers to operating mobility services in regional and rural areas

Compared to urban areas, rural areas are characterised by limited transport options, vast distances, lower population density, different demographics with aging populations, a lack of modal integration, private car dependence, and socio-economic precarity. Mounce et al. (2020) examined how governments support rural transport services through institutional, organisational, regulatory, and financial frameworks and discussed the essential factors for successfully introducing, maintaining, and transferring these forms of good practices. Daniels & Mulley (2012) discussed the challenges and solutions for implementing flexible transport services (FTS) in low-density areas and identified five sets of barriers to implementation, including operational issues, operator and community attitudes, information and education, and discussed specific policy, legislation, and regulation barriers in NSW, Australia. Velaga et al. (2012) examined the potential of flexible and demand-responsive transport to enhance public transport provision in rural areas, identified barriers in implementing and enhancing FTS in rural and remote areas, and offered insights into how to address the lack of opportunities for accessing basic services in distant centres. Pettersson & Khan (2020) investigated the challenges faced by public transport in rural areas and suggest that the utilisation of information and communication technology (ICT) solutions and autonomous vehicles (AVs) can enhance public transport by improving efficiency and reducing costs.

Table 1: Literature identifying barriers to operating mobility services in regional and rural areas

Literature	Data Type	Country	Stakeholders	Identified barriers	integration of travel modes?
Velaga et al. (2012)	Review	Scotland	Transport providers	Complex regulation, lack of institutional support and subsidy	×
Daniels & Mulley (2012)	Semi-structured interviews	Australia	Government regulators and operators of FTS	Institutional, operational issues, community attitudes, education	×
Šipuš & Abramović (2017)	Case Study	Croatia	Transport providers	Adequate public transport services	×
McTigue et al. (2018)	Survey and interviews	Great Britain	Local authorities	Lack of resources	×
Mounce et al. (2020)	Project results and census data	European countries	Government regulators	Institutional, organizational, regulatory, and financial issues	×
Pettersson & Khan (2020)	Case Study	Sweden	Transport providers	ICT and AVs	×

McTigue et al. (2020)	Semi-structured interviews	Great Britain	Bus industry, local and national government, NGOs, and consultants	The availability of financial and staff resources, inter-organizational communication	×
Lund et al. (2017)	Literature review		Transport providers	Regulatory barriers, resistance from public and private institutions, customer adoption	✓
Ewhrudjakpor et al. (2019)	Literature review & Case study	Great Britain	Transport providers	Legal and institutional barriers, financial barriers, political and cultural barriers, and practical and technological barriers.	✓
Eckhardt (2020)	Interviews, online surveys	Finland	National and regional stakeholders, end users	Low population density and long distances, ICT infrastructure	✓
Hult et al. (2021)	Case study	Sweden	State and local governments, transport operators and end users	Limited technical capabilities, lack of expertise, funding limitations, staff availability	✓
Cities Research Institute (2021)	Interviews and one workshop	Australia	Transport agency, local governments, transport operators, and users	Lack of economies scale for mobility services and infrastructure	✓
Leung et al. (2023)	Interviews and one workshop	Australia	State Government, local governments, Transport providers, users and experts	Tourism and transport decision and policy tend to be separated; lack of resources (funding) and costly transport system	✓
Mulley et al. (2023)	Literature review	Finland, Netherlands, Sweden, the US, Japan	MaaS operators	Dominance of short-lived pilots with a small user base, limited prospects for scalability	✓

Eckhardt et al. (2020) presented Rural MaaS as built on networks of transport services formed by Public Private Partnerships (PPP)¹ networks involving collaboration between publicly funded (including health and social care) and private transport services. Hult et al. (2021) explored the feasibility of implementing MaaS in small urban and rural areas, identified critical barriers affecting its implementation, and proposed strategies for overcoming these barriers. Cities Research Institute (2021) identified several barriers to the development of MaaS in regional centres across Queensland, including more sparsely populated areas with a lack of economies of scale for mobility services and infrastructure and a prevalence for industrial and agricultural work that often requires vehicles to carry tools or equipment, and large-scale, out of town, car-centric shopping centres that reduce the need for travel to traditional town centres. Findings from Queensland suggested that overcoming these barriers will require a combination of technological innovation, policy and planning, and collaboration between stakeholders.

Table 1 summarises the literature to identify the main barriers to providing mobility services in regional and rural areas. The common barriers identified by these studies are the lack of financial resources and supporting ICT infrastructure. This is exacerbated by the challenge of operating in a low population density environment with scattered towns and activity centres, where transport providers need support and strategies to sustain their businesses. While the literature lays a foundational understanding, a clear gap emerges: What are the key barriers to leverage the MaaS framework for improving social equity, delivering better transport services and sustainability in rural and regional setting? To delve deeper and expand upon the existing body of knowledge, in-depth interviews were undertaken with a diverse range of stakeholders involved in regional and rural transport, including transport providers (bus, Community Transport, train), government agencies (e.g., NSW Government, peak (industry) bodies), health and aged care organizations (e.g., Federal Government carer support

¹ PPP refers to co-operation between public-private actors in which they jointly develop services and share risks, costs and resources which are connected with these services (Eckhardt et al., 2020).

program, hospitals), and First Nation groups. This study expands the understanding of MaaS in a regional and rural context through a comprehensive stakeholder analysis which, to the best of our knowledge, has not been done before, and reveals new barriers and enablers. Transferable policy recommendations for MaaS implementation suggest the need for tailored MaaS solutions, emphasising the inclusion of marginalised communities like First Nation groups and aged care organisations and highlighting the critical role of governance. These findings are relevant for various stakeholders and address the significant mobility challenges that characterise regional and rural transport markets.

3. Methods

To answer the research question, this paper uses a qualitative method based on case-studies. This section details the selection of case studies, stakeholder identification and development of interview materials, and thematic analysis.

3.1 Selection of locations

MaaS aims to create better mobility services by uniting existing transport services. In a rural and regional setting, the most popular mobility support services include (where they exist) demand responsive transport (DRT), community transport (CT), taxis, buses, carpooling and connections to long-haul transport (coach, rail, and air). Previously, it has been suggested that transport solutions for a rural setting should rely on carpooling and on-demand buses because of their flexibility, and, where practical, active transport should be part of the solution (Frei et al., 2017). Personal electric vehicles should also be considered due to dispersed housing and destinations, but both electric and conventional public transport have medium priority. Carshare, ride-sourcing (such as Uber and Ola), bikeshare and taxis, are ranked low, mostly due to their limited spatial coverage and the need for subsidy. In addition, mobility solutions for rural areas should (ideally) cover a large area, providing the rural hinterland² access to the regional town and other key locations such as regional centres and State capitals. Thus, Rural and Regional MaaS should be seen as spatially diverse to recognise and deliver, as appropriate, mobility services beyond the boundary of a regional town.

One of the arguments for MaaS, that is also relevant to rural areas, includes delivering services that are borderless (MaaS Alliance, 2022). Whilst every context is different, there are some guiding principles for local services, based on achieving an outcome which builds on public transport provision, equity considerations, and economic links. Public transport provision in local areas will normally align with the economic and social context as it focuses on key services that users need and want to access and which, in doing so, provide greater well-being for users.

This study followed a multi-criteria selection process in assessing suitable case study locations in New South Wales for establishing the requirements for Rural MaaS. Initially, 2016 Census of Population and Housing³ data pinpointed Orange, Bathurst, Nowra, Coffs Harbour, and Lismore as potential areas of interest. Using the approach in World Economic Forum (2021) typologies targeting tourism, the Blue Mountains, Nowra, Nelson Bay, Coffs Harbour, and Batemans Bay emerged as further regions of significance. Beyond population-centric criteria, this study integrated factors like public transport availability, as measured by the Public Transport Accessibility Index (PTAI)⁴, and socio-economic considerations, informed by 2021 Socio-Economic Indexes for Areas (SEIFA)⁵ data, to ensure an equitable and holistic approach. Factoring in these diverse metrics, three locations were finally chosen for in-depth interview analysis: Nowra, Coffs Harbour, and Dubbo (Figure 1).

² By way of definition, hinterland is a region, either rural or urban or both, that is closely linked economically with a nearby town or city (<https://www.britannica.com/money/topic/hinterland>).

³ <https://www.abs.gov.au/websitedbs/censushome.nsf/home/2016>

⁴ <https://opendata.transport.nsw.gov.au/dataset/ptal-public-transport-accessibility-level>

⁵ <https://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa>

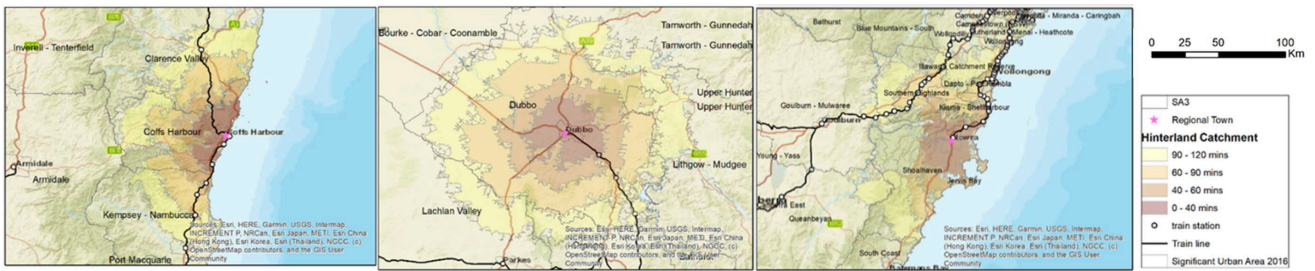


Figure 1. The selected regional towns and their hinterland areas for study

3.2 Stakeholder identification and development of interview materials

In regional and rural areas, the provision of MaaS will need to include a stakeholder group that may be more far reaching than in other contexts. This may include government agencies, transport service providers, health and aged care organisations, community members, First Nations groups, digital platform providers, and business-related sectors. Figure 2 identifies stakeholders for rural NSW.

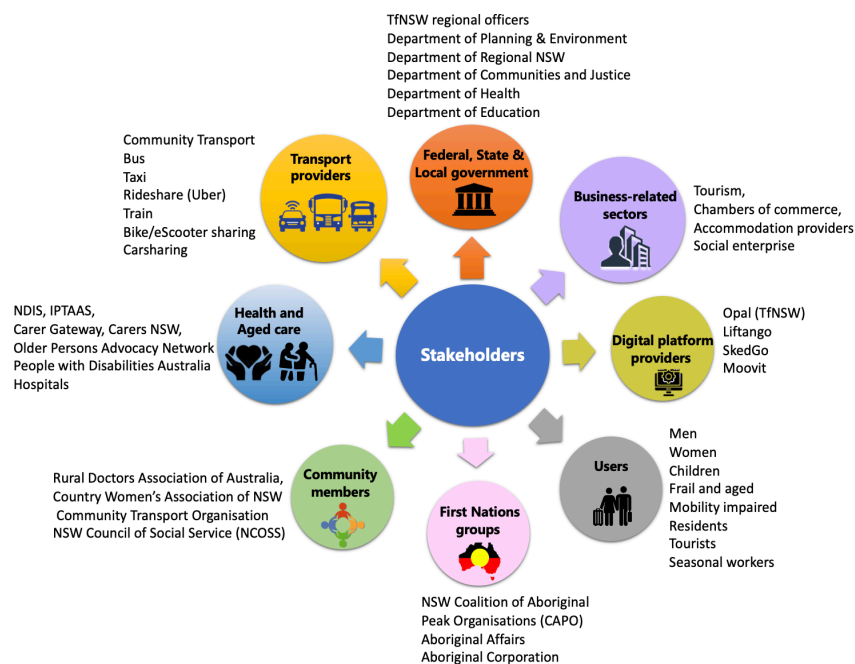


Figure 2. Example stakeholders relevant to implementation of Regional and Rural MaaS

Once key stakeholders had been identified, interview materials were designed to gain insights into the services and products each stakeholder provides and their potential fit within a framework for Rural and Regional MaaS, and how they could be leveraged through greater integration. Interviews sought to establish the barriers transport service providers face in meeting users' needs, key success factors of MaaS, and business opportunities that MaaS will bring.

The interviews explored the interviewee's customer base (where appropriate), the services and products they provide, and their customers' mobility requirements as well as the role of technology in enhancing mobility service provision (e.g., booking, payment, information searching, journey planning) and the potential for a MaaS-like subscription system. The challenges of implementing Rural and Regional MaaS (such as institutional and regulatory barriers) were explored, and interviewees were asked for their views about where key responsibilities should lie in the setting up of Rural and Regional MaaS. The interview outline is given in Appendix A.

A total of 17 stakeholders were interviewed. All interviewees performed some management role at their organisations including Managers (8), Senior Officers (3), CEOs (3), Peer Support Partner

(1), and Senior Directors (2). The workplace city⁶ and organisation type information of each participant are provided in Table 2. Each recorded interview, conducted either in person or virtually, lasted 60 - 90 minutes. In the analysis each participant was given a unique ID for quoting purposes (see Section 4).

⁶ The term city and town are used interchangeably in NSW. Most official communications refer to the three locations as cities. Some interviewees were based in Sydney (e.g., representatives of peak bodies (industry associations) or were the head office for a local provider).

Table 2: List of interviewees

ID	Workplace location	Organisation Type
P01	Sydney	Non-Transport provider (NSW Government)
P02	Sydney	Non-Transport provider (peak body)
P03	Nowra	Transport provider (CT)
P04	Dubbo	Non-Transport provider (Federal Government carer support program)
P05	Dubbo	Non-Transport provider (Hospital)
P06	Nowra	Non-Transport provider (NSW Government)
P07	Dubbo	Transport provider (CT)
P08	Dubbo	Transport provider (Bus)
P09	Dubbo	Transport provider (Bus)
P10	Nowra	Transport provider (Train)
P11	Dubbo	Non-Transport provider (NSW Government)
P12	Coffs Harbour	Transport provider (Bus)
P13	Coffs Harbour	Non-Transport provider (NSW Government)
P14	Sydney	Transport provider (Bus)
P15	Coffs Harbour	Transport provider (CT)
P16	Coffs Harbour	Non-Transport provider (First Nations not for profit corporation)
P17	Sydney	Transport provider (CT)

3.3 Thematic analysis

Interview transcripts were coded following a thematic analysis approach to identify categories grounded on the stakeholders' views and experiences of rural mobility. This method has previously been successfully applied to develop psychological understandings of motives and experiences (Anfara Jr et al., 2002; Sandelowski, 1995). It is acknowledged that qualitative analysis depends on researchers' interpretations of textual data, and thus is potentially open to bias and subjectivity (Ritchie et al., 2013).

The 17 interview transcripts were created as individual cases with different attributes of the interviewees, such as their workplace location and organisation type. Nvivo 20 was used for coding and identifying salient themes. These themes were reviewed and organised to identify frequently cited and significant issues within broader categories. Initial coding was undertaken to assign conceptual labels to pertinent extracts, and these were categorised under overarching themes. The constant comparative method (Glaser, 1965) was used, whereby instances to which similar codes assigned to themes were compared, to develop a better understanding of the core properties of each concept and refine the labels attached to these concepts. Finally, the codes under each theme were reviewed to define and name each of the identified themes. The process was repeated for each new theme that emerged. Table 3 summarises 16 primary themes identified via the thematic analysis.

Following the guidelines for rigorous qualitative research practice (Elliott et al., 1999), rigour was ensured in the analysis through the following five steps. First, during the initial stage of analysis, two researchers coded and analysed all the transcripts. Second, researchers maintained regular discussions to ensure the accuracy and validity of the categories and interpretations. Third, illustrative references were used to support the analysis and demonstrate the credibility of the findings. Fourth, the categories were organised into themes that captured important patterns in the data. Both researchers independently extracted and classified references related to each theme, ensuring the integrity of the analysis. Finally, to ensure reliability, a coding comparison query was performed using Cohen's Kappa coefficient, which can range from -1 to +1, with values above 0 indicating some level of agreement, and a value of +1 indicating perfect agreement between the researchers. The formula for calculating Kappa is shown in Eq. (1).

$$\kappa = \frac{A_0 - A_e}{1 - A_e} \quad (1)$$

where A_0 denotes the observed agreement between two coders and A_e denotes the expected agreement as a result chance. The Kappa coefficients in this study showed a very high level of agreement⁷, with a minimum value of 0.816 and a mean of 0.876 (Table 3). Therefore, the coding presented in this research is valid and can be used for identifying critical barriers underpinning the implementation and success of Regional and Rural MaaS, discussed below.

Table 3: Coding Scheme description and Kappa coefficients

#	Themes	# subcodes	# References	# Stakeholders	mean Kappa
1	Current mobility services and features	23	78	12	0.902
2	Current use of technology	16	42	15	0.916
3	Current payment methods	9	35	11	0.914
4	Current means to know about available services	7	12	1	0.915
5	Barriers of CT operators	16	96	13	0.855
6	Barriers of Bus operators	7	26	17	0.816
7	Barriers of Train operators	3	7	8	0.857
8	Barriers to transport in Aboriginal community	20	72	7	0.842
9	Barriers to implementing Regional and Rural MaaS	11	57	17	0.884
10	Challenges and opportunities for regional and rural MaaS	3	156	16	0.822
11	Impact of disaster and COVID-19 on transport services	3	17	9	0.943
12	Factors influencing the ability to meet needs	11	32	10	0.922
13	Considerations on Regional and Rural MaaS sponsorship	12	20	2	0.824
14	Business opportunities of Regional and Rural MaaS	10	24	5	0.911
15	Key success factors (KSF) of Regional and Rural MaaS	17	131	16	0.854
16	The critical role of governance	16	110	9	0.833

4. Qualitative and Thematic Analysis Results

While the thematic analysis identified 16 themes (as shown in the second column of Table 3), this section focuses on understanding the *barriers* to enhancing mobility for rural and regional regions. Readers interested in other aspects of providing mobility in a regional context (theme 11-16) are referred to in

⁷ One of the most widely cited literature on measuring agreement between observers or coders states that Kappa coefficients between 0.81 and 1 represent almost perfect agreement (Landis & Koch, 1977).

Appendix B which includes the sub-codes for each theme.

4.1 Underlying conditions of mobility services in rural and regional areas

Understanding the current state of mobility services in rural and regional areas provides crucial insights for effective planning and tailored solutions for Regional and Rural MaaS, leading to improved accessibility and enhanced mobility services for residents in these areas. Stakeholders were asked about the features of mobility services available in their local areas (e.g., Community transport, taxi, train, on-demand bus, conventional bus, school bus, hospital patient vehicle). The analysis findings were summarised below.

4.1.1 Current mobility services and features

Of the myriad of public transport services available in regional areas, Community Transport (CT) appears to be most popular for local residents, especially those with special needs. CT operators tended to view their service as a near perfect complement to the existing transport services in terms of connectivity, flexibility, customised fleet, and customer awareness. They offer smaller vehicles, such as all-wheel drives, SUVs, and small buses, which are better suited to navigate narrow streets and challenging road conditions. Their door-to-door services can connect with other transport providers and accommodate various geographic conditions. They also provide tailored mobility services for social activities such as going out for lunch, bingo, or morning tea, which contribute to social inclusion. Findings from the interviews suggested that relying on volunteers could be a two-edged sword. On the one hand, volunteers are motivated and improve service quality, especially for disadvantaged people, and are friendly and enjoy interacting with users. On the other hand, relying on volunteers brings challenges such as driver shortage and uncertainty of service time, which may waste resources and reduce capacity.

Conventional fixed route bus services give users visibility of the service. Since the bus has a regular schedule and routes, users can make their plans beforehand with a good degree of certainty (P09). Another bus operator (P08) appreciated the changes in regulations relating to pick-up locations, by allowing passengers to hail a bus. Other than conventional bus services, private bus services (like a shuttle or limousine service) offering a flexible and reliable service to users can be used to connect with other public transport services, noting that the fees are higher than the regular bus services (P06). On-demand bus services are now more common (Nelson & Wright, 2021) and all of the NSW Government's remaining On Demand bus pilot services in rural and regional NSW were made permanent from 1 July 2022. Minibuses are the primary means of providing on-demand transport in rural areas with sparse demand and narrow roads (P12).

Train services run to a fixed time schedule and offer discounts to concessional card holders. Taking a train is comfortable compared to other modes (although they can be a challenge to access for mobility impaired travellers) and may be used as part of a longer trip which may begin in the local area using a feeder mode. Train operators perceive their value additions in areas like concessional travel, consistency of service, and facilities like chargers and Wi-Fi (P10).

Where practical, active transport ranks as high priority and improvement should be made for safe biking and walking infrastructure such as accessible footpaths, walkways. However, access to services and using active travel as an alternative are hindered by poor quality basic infrastructure in terms of footpaths and dedicated cycleways as well as the distances involved (P15).

There are almost no taxi services available in some rural areas, and several interviewees spoke of services withdrawn completely. Interviewees who spoke about lack of service availability for regular public services also commented on the lack of taxis (P05). Other alternatives that are prevalent in more urbanised areas such as carshare and ride-sourcing were also rarely mentioned because these services rely on greater density/demand than those in many rural areas (P04, P05, P09).

There are several integrated transport services available, for example, 'connected bus and train services' and 'integrated CT and bus services'. Some interviewees were quite positive in their

assessment of integrating train and bus services, and it was mentioned (for example) that there are buses waiting for travellers at the train station at Dubbo to bring them to the destination (P08).

4.1.2 Current use of technology

Several popular multi-modal mobility Apps⁸ were mentioned. These include Routematch, Rome2rio, RollCall, Rydo, and Liftango. Also, the NSW transport agency (Transport for New South Wales) has partnered with industry, researchers, local councils and businesses to develop and co-deliver Automated Ride Share trials in several regional locations in NSW. The trials focused on customer mobility use and the benefits and challenges involved in introducing AV technology. Different 'AV trials' were mentioned several times by interviewees from Dubbo (P08, P09, P11), Nowra (P06), and Coffs Harbour (P12), e.g., an autonomous bus service trial in Coffs Harbour⁹, an autonomous UTE trial from the airport to the zoo in Dubbo¹⁰, and the Armidale Regional Driverless Initiative (ARDI)¹¹.

Although different types of technology have been developed and used in rural areas, interviewees emphasised that it is important to recognise that technology adoption is not just about access to hardware and software but also about digital literacy. Many individuals in rural areas may be hesitant to use technology due to a lack of knowledge or experience with digital devices. Currently, local champions play a critical role in promoting technology adoption in rural areas by building trust, reducing fear and anxiety around technology, and providing hands-on training and support (P01, P05).

4.1.3 Current payment methods and means to know about available mobility services

It was frequently mentioned that cash had been the dominant payment method prior to COVID, however, users have become more inclined to use contactless payment and smart cards (e.g., Opal card), where available, since it is safe and convenient for both users and staff (P12, P08). It was also suggested that more and more users have identified the advantages and convenience of cashless payment methods and thus will transfer from cash to cashless payment. The change of payment methods will be beneficial for the implementation of MaaS in future (P07, P15, P17). Users need to take the initiative to acquire the information about mobility services, indicating that current transport services in rural areas suffer from lack of marketing or information provision.

4.2 Barriers for transport service providers

Barriers to transport provision faced by different transport service providers (CT operators, bus operators, and train operators) are discussed below.

4.2.1 Barriers faced by CT operators

Regarding the funding model, conflicting views exist among CT operators, with some acknowledging the need for funding to support asset-intensive transport services (P15), while others express concern about relying on a single funding source and long-term financial sustainability (P03, P07, P17). Currently, CT services heavily depend on government funding, which is vulnerable to budget cuts and shifting priorities. Funding for CT comes from the Federal government although it is channelled through the states which, in different states, add different amounts of funding for particular aspects and people. The funding model is complex, posing significant challenges for CT providers:

⁸ Routematch: <https://www.routematch.com/>; Rome2rio: <https://www.rome2rio.com/>; RollCall: <https://rollcall.com.au/parents/>; Rydo: <https://www.rydo.com.au/>; Liftango: <https://www.liftango.com/>;

⁹ <https://www.busbot.com.au/>

¹⁰ <https://www.nsw.gov.au/media-releases/smart-driving-utes>

¹¹ <https://www.transport.nsw.gov.au/data-and-research/future-mobility/our-projects/automated-shuttle-trials/armidale-regional>

P17 (CT provider): *“Some will collect the client contribution separately and just collect the NDIS¹² subsidised portion. As for clients who have homecare packages, the client contribution is paid to the package provider, so the operator will invoice the package provider for the full cost of the transport. For CHSP you invoice the clients but are mandated to deliver the transport regardless of whether the person can pay or not.”*

On the supply side, CT relies heavily on volunteers to provide the services. This has both advantages and disadvantages as mentioned in Section 4.1.1. CT providers highlighted the issues relating to labour supply. It is widely accepted that people are largely occupied until they retire, so CT operators face difficulties in providing services due to a shortage of volunteers who can work on weekends and outside regular hours. This can lead to a decrease in the capacity to serve customers (P07).

P07 (CT operator): *“We are not being inundated with the people that we were before, now people work in their normal jobs. It’s harder to get people to do free things since the cost of living is going up, and time is money.”*

Regarding service priority, some CT providers currently operate point-to-point services, but the vehicles are owned by the transport Agency which creates a tension in scheduling and the providers are not able to operate like a business which owns its vehicles. The inability of CT operators to determine service priority is a significant barrier since they have been struggling to provide effective and efficient services without the ability to adjust service priorities based on community needs and demand (P07).

4.2.2 Barriers faced by bus operators

Low demand for public transport is a key challenge for providing high frequency services. This, in turn, poses significant challenges for providing reliable bus services to take more market share from private cars. While some bus operators could adapt their services to suit the high-car-ownership environment (e.g., running a route that passed by the beach and allowed customers to transport surfboards), many interviewees agreed that people with access to a car will likely opt to drive instead of taking public transport, unless fuel prices are high. Also, several bus operators indicated that there is a gap between perception and reality in relation to the accessibility of current bus services. That is, although the buses are accessible, disabled users would still complain about the accessibility of buses, even though they have not used the buses (P09).

P09 (Bus operator): *“Many people complain about the lack of accessibility of bus services. ... After I heard that, I went to a lot of the aged care facilities and brought a bus and showed them, look this is our bus, don’t be scared to catch our bus, you can get on, and we train them in case they are worried.”*

In regional areas, bus services often lack connections with other public transport providers such as rail and CT. This makes it difficult for users who use bus as an access mode for their multi-modal trips. For instance, Coffs Harbour has two main points where buses depart and arrive, and there is a bus interchange between them. However, one bus operator pointed out that the bus services do not follow a fixed schedule or timetable, which makes it challenging to use them to connect to other public transport networks, such as railways. In future, it is expected that the Transport Connected Bus (TCB)¹³

¹² The National Disability Insurance Scheme (NDIS) is a scheme designed to support people with permanent and significant disabilities in Australia, aiming to provide these individuals with the reasonable and necessary supports they need to enjoy an ordinary life.

¹³ The Transport Connected Bus (TCB) Program is delivering state-of-the-art vehicle tracking and automatic passenger counting technology across contracted bus services in rural and regional NSW. <https://www.transport.nsw.gov.au/projects/current-projects/transport-connected-bus-program>

program will play a significant role in connecting bus services with other public transport services by providing customers real-time information and allowing them to plan their journeys.

4.2.3 Barriers faced by train operators

In regional rail lines, where track capacity is limited and volume of freight traffic is high, it is suggested that freight trains have priority over passenger trains, since freight trains typically travel longer distances than passenger trains (P10).

P10 (Train operator): *“For example, we could see that customers wanted to go between Dubbo and Lithgow at 12 o’clock, there might actually be a route of freight services on that time so we would have to engage with those operators and see if they can shift their times, but it’s not a simple thing.”*

Train operators face challenges related to the availability of fleets to meet customer needs and changing timetables to connect with other modes of transport like buses and ferries. However, the train operator may not have complete control over the timetable due to factors like infrastructure maintenance and upgrade works, regulatory requirements, and other external factors(P10).

P10 (Train operator): *“In terms of timetables, we have probably lost some of the control that we had previously as an operator, since the regional and metropolitan timetabling teams consider all modes and decide. If we could make this change, it might better to connect with the other modes.”*

4.3 Barriers to accessing mobility services in Aboriginal communities

Respecting cultural beliefs and practices of Indigenous people is crucial when addressing their travel needs. Incorporating Indigenous art and cultural elements can enhance the appeal of travel websites for Indigenous peoples and promote cultural understanding (P16). However, it is important to use the art in a respectful and culturally appropriate manner with the consent of the artists and Indigenous communities.

P16 First Nations not for profit corporation: *“It’s just like when regional and New South Wales or whoever has artwork on their websites for Aboriginal people, it creates cultural connection, whereas like oh yes they recognise our culture because they’ve got our art there and it just makes us feel more at home, safer rather than just those bland colours.”*

Representatives of Indigenous communities have a deep understanding of their own culture and values and can build trust with other Indigenous people. They can also provide valuable insights to develop culturally appropriate travel services. Uncle Dave¹⁴, a well-known Aboriginal worker, was frequently mentioned as an example.

P13 Non-transport provider (NSW Government): *“In Tweed where Uncle Dave is, people utilise mobility service there, since he’s been 20 years building up community’s capacity.... He’s really supported by the community. The community values what he brings to the table and values what he’s doing for them.”*

Finally, accessing affordable mobility services is a significant challenge for Indigenous peoples, limiting their ability to participate in essential activities. Addressing this challenge may involve collaborating with transport providers to develop solutions that meet the needs of Indigenous communities, such as subsidized transport or partnerships with local organizations. Providing free transport services could increase usage among Indigenous populations.

¹⁴ Uncle David Wandin is a Wurundjeri Woi-wurrung Elder and Cultural Practices Manager at the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation in Australia. <https://livingcitiesforum.org/dave-wandin>.

4.4 Barriers to implementing Regional and Rural MaaS

Lack of familiarity with the technology, such as mobile Apps, creates resistance to technologically inexperienced users. Private cars are preferred due to the comfort, convenience, and freedom of choice they offer, allowing individuals to select their route, destination, and departure time, especially for frequent or long-distance trips. Changing deeply ingrained cultural attitudes and habits regarding car ownership and use, which are often associated with status, can be a formidable challenge. Paying a subscription fee is a significant barrier to the implementation of MaaS, as it can be difficult to justify the cost for users who do not perceive tangible benefits or incentives. In addition, several barriers can discourage users from paying for MaaS, including a lack of available services, low income, infrequent travel patterns, and a lack of incentives. Occasional users may not find MaaS cost-effective, while low-income individuals may find the fees prohibitive.

4.5 Challenges and opportunities for Regional and Rural MaaS

To understand the challenges and opportunities for Regional and Rural MaaS, we employed a qualitative coding approach to categorise the interviewees' attitudes on Regional and Rural MaaS into three primary groups: positive, neutral, and negative. This tripartite categorisation is a recognised method in qualitative analysis (Shabani et al., 2014), allowing for the systematic identification of patterns and sentiments within respondents' feedback. Neutral responses offer a more nuanced perspective and suggest that, while MaaS might resonate well with certain demographic groups, such as younger individuals, it might not cater as effectively to others, notably the older population. The results discussed above indicate a predominantly positive sentiment towards Regional and Rural MaaS, with the number of positive responses (80 references) twice the negative ones (37 references). This clear skew towards positivity emphasises the potential of Regional and Rural MaaS. However, it is evident that there are concerns, as reflected in the negative feedback, that warrant further investigation and possibly interventions. A summary of positive and negative responses is provided in Section 4.5.1 - 4.5.2.

4.5.1 Opportunities for Regional and Rural MaaS

Several interviewees expressed optimism about the future of MaaS. They pointed out that even people in their 70s or 80s are now using smartphones and social media platforms like Facebook. Developing technology is necessary and it should not be assumed that users will reject technology, or will not be motivated to learn the technology, although alternative options should be provided. Training to use new technology should be offered where it is beneficial.

Interviewees believe MaaS can make life easier for people by offering a more convenient, efficient, and sustainable transport system. By integrating different modes of transport and providing users with real-time information and payment options, MaaS can reduce the complexity of using multiple transport services and make it easier for people to obtain information on available services and take long-distance trips. Additionally, MaaS could improve overall accessibility and mobility for people with disabilities or mobility restrictions.

P01 Non-Transport provider (NSW Government): *I think for us, our general recommendations and now value in technology we think is the ways in which MaaS can make people's lives easier.*

P17 (CT operator): *I'm quite keen on the idea of MaaS since it's a way of making it work and making life easier to get where they need to go...*

P02 Non-Transport provider (peak body): *What we hear from carers is that they bounce from place to place to place and go from one website to another website to look for information. So anywhere where it's kind of streamlining information and functions to make that as straightforward and user friendly as possible is always a positive thing. I think enablers of MaaS include reducing red tape and complexity, integrating systems, and making life as simple as possible.*

P14 (Bus operator): *MaaS provides an easier way for people to get around, more options, more convenience, travel when you want to.*

P03 (CT operator): *I think it would make it easier for the client. I think anything that would make a service easier or more streamlined or more financially stable would be better for clients.*

Integrating various modes of transport into a single platform has the potential to enhance access to transport for individuals who have limited options for mobility (P02). Additionally, appropriately implemented MaaS can improve opportunities for connectivity between regional cities and rural towns and larger cities, making it easier for people to travel between these areas. CT could support Regional and Rural MaaS well since CT is a point-to-point service and could easily connect with other services, such as bus, train, car. Integrating CT services into MaaS can provide users with more options and flexibility in their travel, while promoting sustainable and efficient transport solutions (P07).

P07 (CT operator): *I think MaaS is a good idea, because we can get other people to get onto the interconnected services. People may be eligible for a rent ticket, it helps to save our cars doing the up and down the highway, it's cheaper for the passenger and it gets people using public transport.*

Interviewees suggested that MaaS will make it easier for people in regional and rural areas to access essential services, such as healthcare, education, and employment, and participate in community activities. By improving transport options for social and economic participation, MaaS can promote social inclusion and have a positive impact on the lives of people in regional and rural areas, especially for the transport disadvantaged.

P01 Non-Transport provider (NSW Government): *"I think MaaS would have massive benefits to the First Nations community."*

P05 (Hospital service provider): *"My husband cannot drive a vehicle due to the disability, and we didn't have an accessible vehicle, the power chair couldn't transport him, so he was completely isolated. That had a huge impact on his mental health. I believe this isolation will disappear when MaaS comes into our life."*

4.5.2 Challenges for Regional and Rural MaaS

The primary negative concerns highlighted potential challenges for MaaS users, suggesting areas that need improvement to encourage wider adoption. Notably, many of these respondents were apprehensive about MaaS subscription fees, digital payment methods, and reliance on private cars.

A subscription fee can be a significant barrier for some people, especially for those who are living on a tight budget. It is important to consider ways to make MaaS more accessible and affordable for everyone. One solution is to look for alternative financing models, such as government subsidies, and partnerships with local businesses. Additionally, MaaS providers could explore offering tiered pricing plans with different levels of service. Finding a balance between offering valuable services and ensuring accessibility within the financial means of users will be crucial for the widespread adoption of MaaS in regional and rural areas.

P02 Non-Transport provider (peak body): *"Even with small costs, when you are living on \$400 a fortnight that can still be a significant cost considering cost of living.... At the moment, they can't access MaaS if they don't have the money to pay for it. A good solution might be looking at a situation where most people pay the subscription and certain groups can access MaaS in a subsidised way."*

The digital payment methods may pose a challenge for some digitally inexperienced users, and thus providing flexible payment options, such as allowing customers to add funds to their accounts on a weekly basis instead of paying a monthly subscription fee, could make MaaS more accessible to people on a tight budget. Moreover, offering a range of payment options, including cash and mobile payments, could also ensure that MaaS is available to everyone regardless of their financial situation.

In rural areas, personal cars are not only a practical mode of transport but also a symbol of social status and identity. Therefore, changing people's behaviour to adopt new transport options like

MaaS can be challenging. It requires a combination of education, awareness, incentives, and availability of alternative transport options that are convenient, affordable, and accessible. Moreover, promoting a culture of sustainability and highlighting the benefits of reducing car dependence can contribute to making the transition to MaaS more appealing.

P01 Non-Transport provider (NSW Government): *“The car is just so engrained in our culture and its almost a part of a person’s persona. Those that have a car, they’re wealthy enough so they can pay the fuel fees, and rego and everything and replace the car every 10 years...”*

5. Discussion and Policy Implications

Combining insights from the outcome of the qualitative analysis of in-depth interviews underpin the policy implications on implementing MaaS (Section 5.1) and the critical role of governance (Section 5.2) discussed in this section.

5.1 Policy implications for implementing Regional and Rural MaaS

5.1.1 Technology implications for Regional and Rural MaaS

MaaS is conceived as using technology for searching, booking, and paying for end-to-end multimodal transport services. This requires different transport operators overcoming barriers to integrating different modes to provide seamless and convenient mobility options for users (Section 4.2). Achieving integration and providing real-time information and pricing through an App could greatly improve the visualisation of transport services and make it easier for people to access and compare different mobility options, while also encouraging partnership among different transport service providers (Section 4.5.1). For example, a MaaS App could be linked with other government Apps, such as myGov (in NSW) to diversify the offerings and make the App more useful. This aligns well with the notion that travel is a derived demand and that mobility should be seen as an input into a larger activity-based multi service-delivery-paradigm, such as the Mobility as a Feature (MaaF) proposed by Hensher & Hietanen (2023). Non-mobility services could then be included in the offer.

In the long term, the design and delivery of a user-friendly App, which can provide clear and concise information such as available services, routes, timetables, transfer points, and destinations, is critical for the success of MaaS (Section 4.5.1). The smart App should feature automatic voice recognition to make it more appealing to the digitally challenged, visually impaired, and illiterate users. However, not all potential users of mobility services may have access to smartphones or the internet, especially in rural and regional areas where connectivity may be limited. At least in the short term, setting up a special telephone line for non-digital users to make booking is required for improving accessibility and inclusivity of mobility services (Section 4.5.2).

Expanding smart card systems to regional areas would allow rural and regional residents to seamlessly access specialised services as they travel longer distances outside their immediate residential areas. This may involve providing support and assistance to individuals who are not familiar with electronic payment systems or who do not have access to the necessary technology (Section 4.1.3).

5.1.2 Modal landscape of rural and regional areas

The modal landscape of rural and regional areas can be more limited than seen in urban contexts. Conventional public transport is usually present, along with taxis and Community Transport for specific groups of users. In some contexts, on demand public transport is also present, and rideshare services such as Uber are increasingly being introduced into rural towns. The Regional and Rural MaaS framework should include existing modes and use the understanding of gaps in current provision to encourage and nurture new and innovative mobility options beyond the existing offer (Section 4.1.1). These options include those transferring from an urban context such as car-share in some rural towns, while the introduction of shared bikes or e-bikes could be fostered to help with first and last mile

transport. The greatest contribution that a rural and regional framework will make is in the identification and implementation of innovative modes. This could include alternative roles for the private car to harness underutilised car capacity to meet short, and particularly long-distance, journeys.

This research has identified possibilities for a greater role for the shared use of the private car in meeting mobility needs. One idea is the concept of community car club (CCC)¹⁵, which matches private car trips between drivers and potential users. This would be based on a no-fee membership model where the safety and security of the members and the safety of vehicles can be ensured. This could be operated under charitable status. CCC matches requests for trips to specific destinations made by car owners and those made by residents in much the same way haulage companies match loads.

5.1.3 Stakeholder Concerns about tech literacy, subscription fees, and digital payments

There are policy implications related to the main concerns expressed by stakeholders, including negative responses towards technologically inexperienced users, subscription fees, and digital payments (Section 4.5.2). It is noteworthy that the COVID-19 pandemic has played a significant role in driving a shift in digital usage among older individuals in Australia. As people were required to limit their physical interactions, QR codes provided a convenient way for contact tracing and accessing contactless information and services. The widespread adoption of smartphones for scanning QR codes has led to an increased comfort level with using mobile devices among people who were previously hesitant or unfamiliar with them and has, thus, demonstrated the potential for increased digital engagement among older people. As younger generations grow older, it is anticipated that the technology usage gap between older and younger individuals will narrow over time. Encouraging ‘local champions’ to teach and train residents how to use technology is a useful way in regional and rural areas to provide support and assistance to tech-naïve or unconnected individuals. In the culturally sensitive Aboriginal communities, it is important to hire Indigenous workers to build trust between users and transport services. The subscription fee is considered as another significant barrier for the implementation of MaaS initiatives, which will require incentives that can be funded from a wider package of features of the subscription plan, especially for the customer groups that have adopted MaaS or who do not drive frequently. Therefore, the subscription fees could be considered part of the welfare system to avoid leaving behind customers who are in a poor socio-economic bracket.

5.2 The critical role of governance

Government involvement is key to facilitating the implementation of Regional and Rural MaaS, especially when market-driven solutions are unlikely.

In a rural and regional context, a MaaS platform might best be operated by a community-based body with the government providing the key role of facilitating the integration of different transport service providers. Collaboration among stakeholders is crucial for successful MaaS implementation that meets public needs, requiring strong relationships with service providers. Government agencies should run communication campaigns to build trust, promote benefits, and incentivise collaboration. Engaging the community and providers in decision-making leads to efficient solutions.

Facilitating integrated transport services through incentivised contracts can help improve the overall efficiency and effectiveness of the transport system by encouraging collaboration between different modes of transport. Governments can incentivise travellers to try MaaS by offering promotions, discounts, or other benefits to enhance the adoption of these services over time. Subsidies are required for sustainable MaaS in rural and regional areas, and a combination of user-based subsidies and targeted subsidies to transport providers can be effective. Additional subsidies can be provided through the welfare system or discount cards for the transport disadvantaged. It is unlikely that Regional and Rural MaaS will be sustainable in the short-term, or the long-term. Subsidy is likely

¹⁵ Successful matching and expediting could be associated with a donation which will be dispersed to the owner of the CCC and the driver of the private car. The apportion and sum can be decided on a case-by-case basis with some guidance on what might be deemed a fair allocation (for example, a 50:50 split of \$20).

to be needed: financial stability underpins a stable transport network which is important for user understanding of the network and for user commitment to its use (rather than relying only on ownership of a private car). The best approach to subsidy is likely to be a mixture of user-based subsidy, lowering the farebox revenues, and subsidies targeted at transport providers. Additional subsidy to citizens who might still find travel unaffordable could be managed through the welfare system or targeted subsidies through eligibility to discount cards.

An important, and often neglected step is improving potential passengers' awareness of the available services so that these can contribute to unmet mobility needs. In the context of MaaS implementation, promoting users' awareness of available services is the key to generation of patronage. An important role for Government is to educate users about the various transport options available to them through MaaS, and to highlight the benefits of using these services, such as increased flexibility, convenience, and cost-effectiveness.

Overall, Government involvement is key to facilitating the implementation of Regional and Rural MaaS, especially when market driven solutions are unlikely. By utilizing the advantages of technology, governments can facilitate the seamless integration of diverse transport modes, thereby facilitating the implementation of MaaS and mitigating social exclusion and inequality in accessing mobility resources and prospects.

6. Conclusion

This study has explored the barriers to enhancing the accessibility of individuals who live in regional and rural areas, as seen by transport service providers and organisers, and how they may be alleviated through provision of MaaS. Though this study centres on the barriers to improving rural and regional mobility services using Australian examples, the insights are universally relevant as regions with varied public transport systems face similar challenges. The result of this qualitative analysis identifies the operational barriers faced by various suppliers/organisers and examines the factors influencing the ability to meet user needs. The findings emphasise the inclusion of traditional booking methods alongside digital options for Regional and Rural MaaS, while recognising the positive impact of COVID-19 on reducing the technology usage gap and the likely reduction in the future due to younger people aging. Finally, the study underscores the significant role of the government in promoting MaaS through policy regulation, infrastructure investment, funding, and subsidy.

In this paper, reducing social exclusion and improving wellbeing come to the forefront as very important objectives that can be enhanced through a MaaS framework in a regional and rural setting. The analysis provides insights on how deeper integration between various mobility services could facilitate and influence travel behaviour, enhancing user experience, accessibility to surroundings, modal shift, and trust in public transport. Finally, while this research primarily focuses on the challenges and solutions of implementing MaaS in regional NSW, findings from the interviews highlight more general issues of rurality that will apply elsewhere.

Credit authorship contribution statement

Haoning Xi: Conceptualization, Investigation, Data Process, Methodology, Formal analysis, Writing-original draft, Writing – review & editing. **John D Nelson:** Conceptualization, Investigation, Writing - original draft, Writing - review & editing, Project administration. **Corinne Mulley:** Conceptualization, Writing - original draft, Writing - review & editing. **David A Hensher:** Conceptualization, Investigation, Writing - Review & Editing. **Chinh Ho:** Conceptualization, Investigation, Writing-Review & Editing. **Camila Balbontin:** Writing - Review & Editing.

Appendix A. Overview of the questions used in the in-depth interviews

Theme	Questions	Time
Role of your organization	<ul style="list-style-type: none"> • What services / products do you provide? What is your role within the organization? • How many vehicles do you operate (by type) and how many employees do you have? • Who is your main constituency (customers / client base) and catchment area? 	10min
Getting to know your customers	<ul style="list-style-type: none"> • How many customers / clients do you have, what are their main characteristics? • What do you consider to be the strength of the services provided by your organization? • How has COVID-19 and other extreme events influenced your service offer? • Have you complemented / substituted any of passenger services with delivery services? • What are the barriers / enablers to meeting the needs of the customer / client base? 	10min
Mobility requirements of your customers / clients	<ul style="list-style-type: none"> • How do your customers / clients currently move around their surroundings? • How easy or difficult is it for them to reach activities in their neighborhoods? • Typically, what types of destinations do they want to go to? • How do they find they information they need to plan their trips? How do they pay? • Are there destinations that clients want to go that you cannot provide and why? 	10min
The role of technology in enhancing mobility service provision	<ul style="list-style-type: none"> • What technology (e.g., booking, payment, information searching, journey planning) do your customers / clients currently use? • Do your customers / clients have any barriers to the technology and smart phone use? • Do they use Apps or web or call/text center to access your services? • What role is there for technology applied to transport in delivering societal benefits? • If there was a one stop, booking, ticketing solution, paid for via a subscription system with different modes (a MaaS app), would this be suitable for the customers / clients? • Does this idea appeal to you and how might your services fit within such a framework? • How would using technology allow you to provide better services to your client base? • What would be the advantages and disadvantages of such a solution? 	15 min
Implementing Regional and Rural MaaS	<ul style="list-style-type: none"> • What are regulatory barriers and facilitators to implement MaaS for regional NSW? • Are there any other barriers and facilitators you can think of such as operational? • What are the key responsibilities should lie in the setting up Rural and Regional MaaS? • How would you see your organization participating in a MaaS sponsorship scheme? • How would you see your organization participating in Community MaaS¹⁶? 	15 min

¹⁶One idea is to develop the concept of Community MaaS built around the capacity of local stakeholders. Community MaaS might operate with a subscription to a community club where individuals might pay (say) \$4 per month and in return can book mobility services (including deliveries), receive discounts at shops etc (in the form of “rewards”) in a seamless way with reduced effort. A community club would be centred in the community and allow all local residents to participate.

Appendix B

Qualitative analysis of in-depth interviews: A summary of key themes and sub-codes



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