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Mobility as a Service (MaaS)

Transport Australia Society Discussion Paper

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Purpose

This document has been produced by the Transport Australia society of Engineers Australia as a discussion paper on the topic of Mobility as a Service (MaaS). It does not represent the formal position of Engineers Australia, but is intended to inform discussion on the potential role of MaaS in improving transport system efficiency and creating a seamless travel experience.

Introduction

Mobility as a Service (MaaS) is a framework which aggregates infrastructure, services, technology and information to suit the travel and lifestyle needs of the individual. It brings together transport operators and third parties, allowing a seamless provision of service, information, booking, payment and customer relationship management services between transport modes. As an emerging concept, the definition of MaaS is not yet universal. The concept is also referred to as mobility management, future mobility, new mobility or smart mobility, with some jurisdictions considering it an independent framework and others an element of the aforementioned terms. If evolved to its full potential, MaaS has the ability to coordinate multimodal options, improve transport system effectiveness, strengthen public-private relationships, personalise the service to align with user behaviours and promote sustainable transport.

Levels of MaaS

To understand the different types of MaaS and MaaS-like services and their maturity and progression along the ladder, a typology was proposed in the 1st International Conference of MaaS in November 2017 which categorised MaaS and MaaS-like services as different levels, from Level 0 to Level 4¹. The typology is summarised in Table 1.

Level 0 encompasses standalone services/apps such as ridesharing and bike sharing where there is no integration between different modes. Some examples include Uber and GoGet.

Level 1 includes services such as journey planners which integrate information from different transport modes such as Google Maps.

Level 2 services are Level 1 services which now allow individuals to make bookings/payments in the multimodal journey planners. This is analogous to a travel agency where the cost for the separate items (public transport fare, car sharing cost etc.) of a journey are all itemised separately and paid for on one bill. Examples of this are MyCicero in Italy and the domestic Moovel app in Germany.

Level 3 services are Level 2 services which now offer discounts and personalised bundles in the form of a subscription packages. Unlike the “travel agency approach” of Level 2 services, a Level 3 service operator is similar to an all-inclusive charter trip operator in that the customer does not know the cost of the separate items of the entire journey. Examples of Level 3 services are Whim in Finland, UbiGo in Sweden and USTRA/GVH’s Mobility Shop in Hanover, Germany.

¹ Arby, H., Karlsson, M., Sarasini, S., & Sochor, J. (2017). A topological approach to Mobility as a Service: A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals. *1st International Conference of Mobility as a Service* (pp. 187-201). Tampere: Verne Transport Research Centre and Tampere University of Technology .

Finally, Level 4 services integrate a jurisdiction's societal goals with a Level 3 service to incentivise and bring about a desired travel behaviour. There is currently no existing MaaS platform that fits this description.

Table 1 - MaaS Typology summarised from (Arby, Karlsson, Sarasini, & Sochor, 2017)

Characteristic	Level 1 (integration of information)	Level 2 (integration of booking and payment)	Level 3 (integration of the service offer)	Level 4 (integration of societal goals)
Platform	Standalone app or website	App and ICT platform is the main business	App and ICT platform is part of the business	App and ICT platform is part of the business
Responsibility for mobility services	No responsibility	Only for ticketing, bookings, and purchase (similar to a travel agency)	Act as intermediary between the customer and the supplier (similar to a charter operator) Operator needs to be skilled in negotiation with suppliers and in understanding customer needs	Act as intermediary between customer and supplier (similar to a charter operator) Operator needs to be skilled in negotiation with suppliers and in understanding customer needs
Pricing	None	Transparent (itemized by mode)	Non-transparent (bundled service offers)	Non-transparent (bundled service offers), incentives such as discounts and dynamic pricing based on government policy goals and objectives

Supplier integration	None	Potential to be complex and costly due to high number of suppliers	Potential to be lower than Level 2 due to preference for suppliers and less interaction	In addition to Level 2 supplier integration, non-transport suppliers (e.g. retail) could also be involved so as to provide further incentives/discounts for using MaaS
Business model	Advertising supported by large user bases (e.g. Google Maps) or taxpayers	Brokering fees, commissions or fixed supplier memberships	Operates on a “swings and roundabouts” principle – some trips/modes are resold at high margins and some at a loss	In addition to the business model from Level 3, there is a partnership between the public and private sectors to achieve broad societal goals
Potential to induce users to give up cars	Very low	Low	High	High

Maturity of MaaS Concept Internationally

There is still a high degree of ambiguity surrounding the MaaS concept.

With multiple sources vying to offer definitions of MaaS, many of which deal with only small aspects of the concept (i.e. new modes, new journey planning apps, integration with aggregation, aggregation without value designed in etc.). Currently, there is no comprehensive assessment framework for evaluating their characteristics, or outcomes in a systematic manner.

However, the simplified roadmap created as part of the Mobility as a Service for Linking Europe Project², in combination with the aforementioned MaaS typology can help provide a good indication of where a country stands within the projected development of MaaS as a concept.

² Apaoja, A., Eckhardt, J., Karlsson, M., Konig, D., Nykanen, L., & Sochor, J. (2017). *Deliverable 2: European MaaS Roadmap 2025*. Conference of European Directors of Roads.

Table 2, Table 3, Table 4, and Table 5 provide insight into the level of maturity of MaaS within nations such as the United States (US), Canada (CAN), United Kingdom (UK), Germany (GER), Sweden (SWE), Finland (FIN) and Australia (AU) with respect to the following functional components:

- **Drivers:** The available and enforceable existing and/or future policy and regulations necessary to the MaaS concept.
- **Enablers:** The level of collaboration present between entities whether public, private, cross-sector or international.
- **Markets:** Indicative of the integration and acceptance of MaaS as a concept.
- **MaaS services:** The level of different MaaS services as characterised by the MaaS typology.

As evidenced by its position along the roadmap for each of the four respective functional components, the development and presence of the MaaS concept within Australia is still in its infancy. Current MaaS concepts exist in the form of small trials as well as in brief, high level descriptions within strategic plans.

Table 2 - International standing along simplified MaaS roadmap with respect to existing and/or future drivers (table extracted from (Apoaja, et al., 2017))

	Status quo	+1-3 years	+4-9 years	Vision 2025
Drivers	Tightening efficiency and environmental requirements	Urbanization and change of urban structures		High efficiency and utilization rate
		Decreasing public funding		Cross-cutting collaboration and coordination
	Goals for increasing the share of PT	Incentives on all levels	Automation and changes in vehicle fleet (shared, electric, connected)	
	Digitalization develops			Accessible and sustainable transport for all regions



Table 3 - International standing along simplified MaaS roadmap with respect to collaboration between different entities (table extracted from (Apaoja, et al., 2017))

	Status quo	+1-3 years	+4-9 years	Vision 2025	
Enablers	R&D funding available	Principles for cost/profit/subsidising	Systematic research; MaaS integrated into academic domain		
	Extensive national and international networks	Cross sector operation models incl. all transport modes; viable business models (B2B, B2C, P2P, B2G...)			
		Standards for data ticketing...	Pol. and econ. Steering promoting sustainable society development		
	Roadmaps and strategies under development	Incentives for using MaaS; changed mind-set (public/private...)		Guidelines for city/infra planning	
		International MaaS platforms	MaaS as a part of combining societal services		
		▲ AUS, US ▲ CAN	▲ UK ▲ GER, SWE	▲ FIN	

Table 4 - International standing along simplified MaaS roadmap with respect to the level integration of the MaaS concept in the market (table extracted from (Apaoja, et al., 2017))

	Status quo	+1-3 years	+4-9 years	Vision 2025
Markets	MaaS hype and uncertainty	Steadily growing and stabilizing MaaS market		Profitable MaaS markets
	Few MaaS offers and low market share	Mobile services becoming more common and intelligent		Strong demand for MaaS services
		Change of user demands: safe, easy, fast, flexible, comfort	New forms of collaboration and cross-financing (e.g. PPP)	
	Uncertainty regarding legal possibilities		Service coming to people	Strong demand for MaaS
		Blur the walls of modal silos	Business for data and services	P2P services commonly available
		▲ AUS, CAN, US	▲ GER, SWE	▲ FIN

Table 5 - International standing along simplified MaaS roadmap with respect to the level and complexity of existing MaaS services (table extracted from (Apaoja, et al., 2017))

	Level 0, Level 1 MaaS	Level 2 MaaS	Level 3 MaaS	Level 4 MaaS	
	Status quo	+1-3 years		+4-9 years	Vision 2025
MaaS services	Increasing number of pilots, of which best will scale-up			One-stop-services combining all purposes of mobility and activities	
	Expanding service iteration and combinations				Minimum SLA for MaaS defined
	Imbalance between transport modes	Combined public and private sector; cars as part of public transport (i.e. redefined PT)			
		One-stop-shop mobility services from cities to everywhere		PT carried out as DRT	
	Opening up data and interfaces proceedings			Defined my data concept enabling efficient data analysis	
	▲ AUS	▲ US	▲ UK	▲ GER, SWE	▲ FIN

MaaS Framework

The key fundamental premise in the MaaS framework is that the customer’s transactional interface is shifted from the mobility (transport) operator to the MaaS provider. Regardless of the business model, the implementation and operation of a MaaS service requires a single identity for a user, open data, and open payment methods from various transport modes.

Models of Operation

There are three key operational models for MaaS:

1. The private company model,
2. The public entity model and
3. The public-private partnership (PPP) model.

In the private company model, the MaaS aggregator is completely owned by the private sector and it coordinates and aggregates the different modes of transport service providers on to its own technology platform to offer to the customer one integrated and personalised mobility service. Whim in Finland offered by the company MaaS Global is an example of the private company model.

In the public entity model, the MaaS aggregator is government owned. The government coordinates and integrates the technology platform with mobility suppliers (transport operators) and with local

communities, cities and national governments. Travel Spirit in Manchester and UbiGo in Sweden are examples of the public entity model.

A PPP model pulls together the commercial return and covers the social, environmental and equity needs of the community. Additionally, such a model has the ability to provide additional revenue streams for the public sector which assist in funding services to meet equity (social justice) objectives. There is no commercial example of such a model in operation at the moment.

At present, there is no clear view as to which the optimal operational model for the delivery of MaaS is as it is still at quite an early stage.

Consideration for Australian Commonwealth and State Governments

At present, MaaS is largely being driven by commercial imperatives which may or may not align with government strategic transport and land use goals.

An institutional overlay is required to ensure service delivery is consistent with societal objectives.

A coordinated approach should chart the preconditions that must be in place and the obstacles to be removed to enable a healthy market for MaaS services to emerge and to remedy any potential imperfections of markets.

A fundamental shift from managing transport to facilitating an aggregated mobility offer is required, largely to accommodate changing consumer expectations and new industry dynamics created by technology as many new and emerging service models are developing very quickly.

The benchmarking exercise and review of literature on the concept of MaaS suggests there is a general agreement that the role of the government should be to enable the innovation and delivery of MaaS rather than be the MaaS aggregator or provider. A major part of this role is ensuring that there is regulatory and legislative support for MaaS delivery. It is important to use the potential of MaaS to address environmental, social equity and wider economic issues and to avoid the situation where MaaS providers only concentrate on commercial outcomes and delivery of services in urban and high-income areas.

The ultimate goal may indeed be for a national system of mobility that will allow users to travel freely across state borders without needing to join several different systems.

Future projects and plans must be assessed through the lens of MaaS, to minimise the very real risks that major investments could be rendered redundant over the longer term. Future bus operator contracts, fleet procurement and purchase decisions will all need to account for new and emerging technologies and service delivery models. Furthermore, government agencies will need to re-consider current procurement processes and timelines that may be too long, with the very real risk that initiatives can be superseded prior to the product being operationalized.

Governments also have a tremendous opportunity, indeed responsibility, to up-skill existing resources to enable a future transportation system that incorporates all these new and emerging technologies and data.

Government support is also required to ensure the necessary skills are in place within both the private and public sectors. Partnerships with the private sector are also likely to be more critical along with more flexible and responsive procurement processes to incentivise private-sector innovation.



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