Mobility as a Service

DETAILS

SECTOR | Transport

STAGE | Operations and Maintenance

TECHNOLOGIES | Applications, Smartphones, 4G/5G, Sensors

SUMMARY

At its core, Mobility as a Service (MaaS) relies on a digital platform that integrates end-to-end trip planning, booking, electronic ticketing, and payment services across all modes of transportation, public or private.

The goal of MaaS is to leverage the best of today's technologies to provide users with the possibility to move easily and cost-effectively without owning a car, attracting new users to public and shared transport and, by utilizing captured data, creating new mobility services to respond and adapt to the evolving demand for each user type.

The global movement towards MaaS is fuelled by an overarching desire to make cities more liveable and connected, which has been widely understood to mean less vehicle ownership centric. Consumers have increasingly embraced new mobility options and apps over the last decade as journey planning apps have become commonplace. The natural next step is to bring all options together on a common platform, enabling journey planning across a range of transportation modes (public and private), offering flexible payments and personalization based on user preferences regarding time, comfort, cost, and/or convenience.

Congestion is a major issue for cities around the world. This is expected to worsen as populations rise, with millions more people expected to migrate to urban centres. In response to this growing issue, transport planners are exploring new solutions to meet this increasing demand, rather than simply expanding infrastructure capacity (e.g. more roads and/or more transit), that can support the development and catchment of mass transit solutions. Furthermore, users of transport services are increasingly expecting tailorable and flexible solutions to meet their changing needs. Through its integration of all transport modes and its route suggestion capabilities, MaaS solutions can provide alternate options for users based on their specific preferences (e.g. cost, travel time, directness, number of mode changes, environmental impact etc.)

The development of MaaS is expected to rapidly increase in the coming 5-10 years. The solution will enable increased adoption of transport services, particularly new services such as Demand Responsive Transport (DRT) (*see use case*) and shared and micro mobility modes (e.g. car sharing, ride sharing, e-bikes, e-scooters). MaaS is also expected to provide a more tailored response to travellers' needs, providing them with accessible, adequately priced seamless transport solutions, while enabling the operators and government to better understand their needs. Thus, governments and operators can capitalise on the benefits of MaaS in transport strategies and policies to generate more public transport uptake and provide enhanced customer experience while optimising their operations costs.

VALUE CREATED

Improving efficiency and reducing costs:

- Improve utilization of transit providers and transport network
- Optimise cost of expanding physical infrastructure (roads, transit, first/last mile)
- Reduce fare cost to the user by implementing new payment structures such as subscription-based offerings

Enhancing economic, social and environmental value:

- Provide flexible door-to-door transport offerings tailored to user specific needs, improving accessibility to the transport system
- Reduce congestion and travel times and enhance user experience
- Improve energy efficiency and use of renewable fuels by integrating and encouraging eco-friendly transport solutions (electric vehicles, cycling, shared services)

POLICY TOOLS AND LEVERS

Legislation and regulation: MaaS is a ”Multi-Sided Platform” (MSP) relying on existing and proven systems and technologies. However, it requires the buy in of all providers in the mobility ecosystem to ensure success. It is not certain that all private providers in a region will be interested in joining the aggregation platform nor in sharing their data (which could lead to multiple platforms operating in competition detrimental to the transport network). It falls to the government to introduce relevant regulations to achieve this aggregation. Incentives can be used to bring providers to the table.

Effective institutions: A diverse range of stakeholders need to cooperate; mobility regulators, telecommunications operators, payment processors, public and private transportation providers, and local authorities with responsibility for transportation and city planning. Government should define the vision and set the metrics by which success is measured using data shared by all the previously mentioned actors. Moreover, the public sector can encourage behaviour that aligns to broader public policy goals. To be effective, the mobility offer must be well integrated and delivered in a way that responds to customer demand and offers an enhanced customer experience.

Transition of workforce capabilities: The success of MaaS relies on the right combination of key capabilities to develop the following:

1. Clear governance and set outcomes: Have the relevant strategic planning skillsets in Governments and transport authorities to develop relevant integrated mobility strategies and decisions to maximize public assets value
2. Customer-centric services: Scalable and flexible MaaS services with public benefit objectives, ensuring that transport providers understand how MaaS works so the points under ‘effective institutions’ and ‘legislation and regulation’ are enacted effectively.
3. Unified operating solution: Cooperation of public and private mobility actors and efficient aggregation of the overall mobility offer, technologies and data, ensuring the operator of the MaaS platform knows how to run the platform.

Funding and financing: To develop partnerships with mobility providers in each city is a resource-intensive endeavour that requires significant time and funding, particularly for private MaaS solution developers who may not already have relationships with local transport operators (public and private). Existing relationships between public authorities and public/private transport operators should be utilized to enable the delivery of an effective and affordable solution.

Procurement and contract management: The dynamics between public and private transport providers should be clearly defined. MaaS solutions require new contractual arrangements based on outcomes linked to public benefit objectives and key performance indicators that should be monitored more frequently with contractual management systems that would enable near real-time monitoring of the MaaS systems’ performance.

IMPLEMENTATION

Ease of Implementation 	The implementation of MaaS is different from city to city, country to country. It will be affected by a multitude of local factors including existing supply and demand for transport services. To implement a solution, the MaaS developer is well placed to invite various public and private stakeholder to collaborate. A major hurdle will be the willingness of operators to get involved with such a solution and developing a business model that will prove attractive to all. The solution will require various inputs including route and schedule information, fares, construction works, weather information etc. and then consider the reliability of that information.
Cost 	For a MaaS business model to be sustainable, one cannot ignore the function of shared economy. The cost of operations of MaaS are relatively low, as the shared information enables an optimisation of the transport offerings and easy combination with other city services such as the electricity grid, commercial retail, etc. Ultimately, the viability and sustainability of MaaS hinges on a shared economy of infrastructure.
Country Readiness 	To work effectively MaaS requires widespread use of smartphones on 3G/4G/5G networks; high levels of connectivity; secure, dynamic, real-time information on travel options and updates; and cashless payment systems. There should also be a thoughtful integration of the transport network and its modes, that enables seamless and informed transfers between transportation services. To date, MaaS solutions have been adopted in more densely populated urban areas. Expanding to include wider geographical regions can be complicated by multiple authorities with conflicting objectives.
Technological Maturity 	While the application development and ticketing technologies already exists and can partially participate to provide MaaS services, the MaaS enabling platform that should aggregate all transport (public, private) operations data currently does not exist yet in a calibrated way. This is a result of the data sharing framework not being fully created nor implemented.

RISKS AND MITIGATIONS

Implementation risk

Risk: There is a risk that multiple MaaS solutions are developed, each encompassing different transit operators, rather than one holistic solution. This would be less successful, as users would need to use multiple applications to have access to the entire service offering, thereby reducing convenience, or would only choose one, thereby limiting their options.

Mitigation: If a government wishes to avoid this, they must act in collaboration with MaaS developers to ensure a single solution is developed that meets the needs of the area, the transport operator and its citizens. Governments should work to encourage operators to buy in to the solution, thereby providing users with the widest possible transport offering.

Social risk

Risk: There is a potential threat to transport and social resilience through over reliance on single operators of innovative services. In some places mass transit has been reduced in favour of shared service providers. Overreliance on major providers such as Uber amplifies business failure risks as failure of these providers could leave car-less residents with limited mobility options. There is also a risk that users will not buy in to the MaaS solution due to customer experience / satisfaction issues, ongoing competition or habit.

Mitigation: Appropriate regulations on the shared services linked to the public infrastructure should limit those risks. To mitigate this risk, users' requirements and preferences focus (cost, directness, environmentally friendly, travel time, safety, etc.) should be investigated prior to launching a solution; the design of MaaS should consider those specific preferences (including the cultural and geographical aspects). Incentives and personalisation of services can be introduced to encourage user shift to the MaaS service.

Government led safety guidelines should address issues around shared vehicle driving, service provision, consumer protection, liability, and equal access. Government entities can use their power to foster equity in transportation provision, ensuring geographic coverage and accessibility, as well as serving low-income and underserved populations.

Safety and (Cyber)security risk

Risk: Data-centric services inherently carry cybersecurity concerns, such as who owns the data, the user or the service? What constitutes ethical appropriate use? Should user data be automatically shared with law enforcement and emergency services or for specific purposes, such as managing crisis? The right combination of using user-specific data and transport preferences to match the multimodal transport offered, means a compromise must be made based on utility and priority order, between user data sharing and data protection to meet the management of demand and supply, such as during pandemics.

Mitigation: Governments must and are already answering these issues and users must be made aware of the implications on their privacy.

Environmental risk

Risk: MaaS subscriptions may have the unintended effect of encouraging users to select private options like taxis over public transport. If a user opts for a subscription that provides for unlimited taxi and/or carsharing usage, the cost incentive to use public transit is eliminated. This would lead to increased numbers of vehicles on the road, more congestion and ultimately more emissions.

Mitigation: MaaS providers should collaborate closely with local authorities to ensure the subscription options on offer are tailored to drive the desired behavioural outcomes.

EXAMPLES

Example	Implementation	Cost	Timeframe
Whim, Helsinksi, Finland	An all-inclusive MaaS application developed by MaaS Global. Initially the local transit agency did not open its ticketing to allow Whim subscribers to enjoy the convenience of the agency's monthly pass (instead, Whim users had to obtain a new ticket every time they rode). In 2018, the Act on Transport Services was passed requiring transport providers to make their full ticketing functionality available to third parties.	Whim offers three tiers of service: a pay-as-you-go option; a EUR 49/month (approximately USD 55) "Whim Urban" subscription for unlimited public transport and reduced rates for taxis and carshares; and a EUR 499 (approx. USD 565) "Whim Unlimited" package that adds unlimited taxi and carshare access. Most of Whim's Helsinki users use the Whim Urban option.	Developed for Helsinki in October 2016. Whim is now expanding to Singapore, Birmingham, Tokyo, Vienna, Antwerp and the US.
MinRejseplan	Created by the Transport Authority for Northern Denmark, MinRejseplan is a new generation of the Rejseplanen journey planner app, servicing the city of Copenhagen.		Launched in September 2018.
NaviGoGo	Pilot in Scotland's Dundee and North East Fife regions (part of the Pick&Mix program) aimed at improving how young people aged 16-25 relate to, use, and combine travel modes and transport services to meet their lifestyle needs, without the requirement to own a car.	The service aimed to be financially sustainable, offering value for money for the user, as well as creating economic value for transport providers. The 98 trial participants booked more than 480 journeys and paid for them using their NaviGoGo stored account balance. Users of the pilot spent more than GBP 3,500 (approximately USD 4,350) through the platform.	Six-month pilot held 2017-2018.