Mobility as a Service ('MaaS') Regulatory Models

Building a common, connected, and interoperable ground for the future of mobility

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Introduction

Purpose of this paper

Mobility as a Service ('MaaS') provides a new approach to travel as an all-inclusive experience, providing customers with a seamless mechanism for planning, booking, paying for, and being supported during and after, travel across a broad range of mobility options.

Establishment and operation of a MaaS scheme is subject to a wide array of regulations, ranging from transport and retail legislation through payments, banking, data protection, employment, and competition frameworks. There are also significant variations in these regulations across regions, countries, and even at a local / city level.

This document, developed by the MaaS Alliance's Governance and Business Models (G&B) working group, seeks to set out the breadth of regulation that applies to the establishment and operation of MaaS schemes, good practice regulation (insofar as it supports MaaS), areas for improvement, and where convergence is required. Its aim is to:

- Provide an evidence base which businesses, government and regulators, can use to inform discussions on the future evolution of regulatory frameworks; and,

- Provide a knowledge base for those looking to establish and operate schemes.

The document is not intended to present a complete picture of all relevant regulations and readers should recognise that it has been drafted at a point in time and will require updates as regulations change.

While the majority of examples in this document refer to European examples (both within and outside the EU) the principles apply globally.

Links to other documents

This paper is one of a series of initiatives from the MaaS Alliance which includes work on a template Financial Model; a series of white papers on topics relevant to MaaS; surveys of MaaS industry stakeholders; and regular meetings and attendance both at MaaS Alliance meetings and wider industry conferences and events.

Overview of contents

The paper outlines the **need for harmonisation** based on the divergent existing practices in MaaS schemes around the world; **existing initiatives** and case studies from live and closed MaaS projects in various countries; the **current landscape of regulation** in transport provision, procurement or development, and MaaS' interaction with customers, Government agencies and transport operators; the **potential of regulatory sandboxes** as a measure to test and trial new ways of working; and a set of **recommendations**.

Authors and version control

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Executive Summary

Summary of findings

A range of regulatory models exist in MaaS platforms globally.

Regulations affect the interaction of MaaS with transport operators, with Government agencies (who may or may not be procuring a MaaS platform) and with customers.

The divergence in regulatory models mirrors the lack of clarity in MaaS generally, and with the related question of business models.

Case studies of existing projects show that regulations and regulatory questions are some of the most live discussions in the MaaS industry, with a lack of clarity about where public agencies should go for advice and what questions they should be asking.

The role of regulations varies according to the "flavour" of MaaS being developed, and to what extent the local Government agency is the owner, funder, developer and/or operator of the MaaS platform.

MaaS platform developers currently have to deal with a wide range of regulatory models in MaaS and would mostly welcome the increased certainty and clarity which would come from a guiding set of principles.

Recommendations

The guiding principles set out in this paper are that clarity of aims and objectives is critical; that extensive and collaborative stakeholder engagement early on in a project helps to resolve potential issues around regulations; and that MaaS can thrive in a range of regulatory models but each instance has its unique characteristics and requirements.

Government agencies should learn lessons from best practice, emerging models and regulatory sandboxes to implement MaaS platforms which are technically effective, politically viable and commercially sustainable.

MaaS platform providers should engage with emerging standards and aim to collaborate while protecting their commercial interest.

The MaaS community should support the development of new regulations such as theMultimodal Digital Mobility Services (MDMS) and actively participate in the emergence of a clear set of regulatory guidelines on what makes MaaS work.

- For MaaS to thrive, the MaaS Alliance identifies the following actions / next steps: Codify and undertake a structured, detailed gap analysis of the range of regulatory models active and proposed in key target markets for MaaS

- Work with local and national governments to establish one or more regulatory sandboxes which can accelerate the development and testing of new models, to act as "lighthouse" initiatives for deployment globally.

Chapter 1: The need for harmonised regulations

Over the last decade multiple MaaS projects have come to life globally. MaaS is considered as a "socio-technological phenomenon [which] creates challenges across regulatory fields spanning from the delineation of property rights and data governance to urban planning and competition".[1] One of the main challenges of MaaS are related to business models, data sharing and standardization, but also digital sovereignty and the fiscal aspect of data-sharing.[2]

The absence of consistent regulation in the markets has resulted in a disparity in projects, a fragmentation of this new market and the creation or maintenance of monopolies. Harmonised regulations can provide a positive answer to the negative effects. The development of MaaS solutions also goes hand in hand with the emergence of new transport operators. However, the lack of harmonized regulation on this topic creates a barrier at the entrance for new transport operators. Indeed, in the case of car sharing, they need to "follow different procedures to obtain the parking permits in different cities (even within the same country), an example being Amsterdam and Den Haag".[3] "A harmonized and uniform system of regulations and requirements is needed especially for small companies or start-ups that strive to adapt their business to each city in which they operate".[4]

Another example is from the MaaS4EU project, which concluded that major legal and regulatory barriers exist for the implementation of MaaS services that make participating in a MaaS scheme difficult for suppliers and public service providers. The project stresses that regulations and passenger rights largely differ across different modes, due to the lack of a unimodal approach in the EU legislative framework.

Before stepping into this topic, it is necessary to establish the difference between soft and hard regulation. Soft regulation refers to instruments that are not legally binding, or whose binding force is somewhat "weaker" than that of hard regulation. It can take the shape of codes of conducts, guidelines, roadmaps and peer reviews. On the contrary, hard regulation refers to legal obligations that are binding and which can be legally enforced before a court. Regulations on market entry can for example play an essential role in ensuring a competitive

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[1] [Regulating Mobility-as-a-Service by Oreste Pollicino, Valerio Lubello, Aleksandar Stojanovic :: SSRN](#)
[2] [Regulating Mobility-as-a-Service by Oreste Pollicino, Valerio Lubello, Aleksandar Stojanovic :: SSRN](#)

[3] [Microsoft Word - ProMaaS_DEL03 final (europa.eu),](#) p.27
[4] [Microsoft Word - ProMaaS_DEL03 final (europa.eu),](#) p.27

environment with efficient MaaS providers.[5] Regulation also allows the creation of a trustful environment which allows for a fair data exchange between actors.[6]

MaaS platforms are subject to hard law, for example in the EU, legislations such as the ITS Directive, Digital Services act and the Digital Markets acts (if the scope meets the required threshold). As actors of the transport sector the relevant legal regime will also apply to them. Nevertheless, and despite the EU legislations, there is little harmonisation. The role of governments and transport authorities is multi-faceted and differs across the EU countries. This results in regional and local variations of application of MaaS solutions.[7] In other jurisdictions globally similar disparities and lack of harmonization are apparent.

It is thus relevant to expose the impacts of positive and negative regulation on MaaS.

Example of positive regulation

Netherlands

The Dutch legal framework enables, since July 2020, the creation of a platform that aggregates mobility services of different transport market players for users. The Authority for Consumers and Markets (ACM) allowed this under the condition that traditional public transport operators open their platforms to other mobility providers as well as other MaaS providers under equal conditions. It also included the prohibition "to impose exclusivity obligations on market players using their platform, and the obligation to make their traditional transport services (bus, tram, subway, and train) accessible to other MaaS app providers".[8]

Austria: Vienna

Another example of positive regulation or actions for the development of MaaS solutions, is the creation of public databases with information on the different mobility services. This was namely the case in Vienna where the local authority was involved in "building a database with information (e.g. pricing, timetables) on various mobility services, thus potentially allowing private operators to develop their own tools relying on the public database""[9]. This contributed to the development of the MaaS WienMobil service.

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[5] [Competition and Regulation in the Provision of Local Transportation Services (oecd.org)](#) , p.18
[6] [Regulating Mobility-as-a-Service by Oreste Pollicino, Valerio Lubello, Aleksandar Stojanovic :: SSRN](#)
[7] [polis-maas-discussion-paper-2017-final_.pdf (polisnetwork.eu)](#). P.3.
[8] [Competition and Regulation in the Provision of Local Transportation Services (oecd.org)](#) , p.21
[9] [Competition and Regulation in the Provision of Local Transportation Services (oecd.org)](#)

Finland

One of the main obstacles to the development and use of MaaS solutions, remains data ownership. There Finland introduced the "Act on Transport Services". This act ensures that passenger transport service providers' service data are "freely available from an information system (open interface) in a standard, easy to edit, and computer-readable format".[10]

Overall

Some authors also argue that "taxing vehicles, fuels, and road use will significantly influence MaaS regulatory policies."[11]

Examples of adverse regulation

These include where regulators are also operators, and where the framework is okay but the application is not.

Regulations, such as public obligations and concessions, giving public transport operators, "which might position them in an advantage position compared to smaller transport operators, which therefore may experience some difficulties in gaining market share".[12]

A way of overcoming this issue is to reduce barriers to entry for new smaller operators by ensuring standards for data processing procedures should be established and implemented by policymakers (Lajas and Macário, 2020).

Another adverse regulation is the lack of regulation regarding the "opening of the ticketing systems of transport operators, with public transport operators that need to make available their travel products to different MaaS providers. Also, the presence of different regulations, requirements and permits procedure for shared mobility services".[13]

In the UK, the Bus Services Act has mandated the sharing of open data related to ticketing, scheduling and real time information for bus services, which itself is a great initiative but is limited to one mode.

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[10] [Microsoft Word - ProMaaS_DEL03 final (europa.eu),](#) p.20
[11] [Microsoft Word - ProMaaS_DEL03 final (europa.eu),](#) p, 19
[12] [Microsoft Word - ProMaaS_DEL03 final (europa.eu),](#) p.27
[13] [Microsoft Word - ProMaaS_DEL03 final (europa.eu),](#) p.27

Chapter 2: Existing initiatives and gaps

As Mobility as a Service (MaaS) continues to gain traction around the world, regulatory bodies are beginning to develop frameworks to govern this new form of transportation. These regulatory models can take many different forms, from national laws to regional initiatives to city-level programs.

In the previous chapter we talked about the need for harmonization. We went through different examples of positive regulation and different types.

In this chapter, we'll deepen the existing initiatives and take the best practices that can work as example for new harmonized regulatory frameworks.

Case studies

Finland (FI) – Act of transport services

In 2018, the Finnish government issued the "Act on transport services", also known as the "Finnish Act": a law on transport services that brings together legislation on the transport market, creating the preconditions for the digitalization of transport and for the creation of new business models.

The Finnish Act states the importance of promoting fair competition and equity in the transportation market and the competitiveness of both passenger and freight transport service providers.

In addition, a framework is created for a more efficient supply of publicly subsidised passenger transport through digitalization, combined transport and different types of fleets. Highlight when we come to MaaS, the Finnish Act played a decisive role in enabling the launch of Whim's first MaaS experience in Helsinki.[14]

The Transport Services Act opened the transport market by clearing away some obstacles to market entry and regulations that limit competition. It also established conditions for applying transport operator data and public authority data pools more effectively.

Essential data on transport services was opened by the Act. The Act also laid down provisions for the interoperability of ticket and payment systems.

Examples of this include progress in using various applications, journey planning applications and data throughout the transport sector. Significant progress has been made in

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[14] https://www.bipformaas.it/en/maas-and-governance-a-look-at-the-europe/

opening interfaces and in data interoperability, establishing improved conditions for the emergence of new services. [15]

Belgium (BE) – Flemish MaaS agreement framework

Creation of an inter-federal vision for Belgium with the future creation of codes of conduct.

The Flemish government published a framework agreement for Mobility as a Service (MaaS) after a broad consultation and co-creation process with relevant stakeholders.

This approach is called "soft" or "collaborative regulation" where public and private MaaS stakeholders develop supported, dynamic, and scalable regulations through a multi-year co-creation process.

The main focus of the MaaS core stakeholders in Flanders is sustainable combined mobility or combi-mobility, where users can combine different transport modes during the same route and combine different vehicles spread in time.

The five MaaS stakeholder groups involved in the process include users, MaaS providers, transport providers, local authorities, and data brokers.

The Flemish government is facilitating and supporting the process while cooperating in executing the concrete agreements.

Queensland (AU) – Regulator running MaaS Trials building the shared ecosystem and customer facing apps

Considering all the regulations within the law book that may need reform that would enable MaaS within the jurisdiction. In Australia and within the state of Queensland, the Department of Transport and Main Roads has partnered with the University of Queensland, a corporative research centre and industry to create a MaaS trial.

The trial, known as ODIN PASS, commenced in 2021, has seen over 7000 participants use a multi-modal, multi-service application to travel within the state's capital Brisbane and the surrounding cities. Importantly, the trial seeks to understand the viability of a local, sustainable business model for MaaS and to consider what supports are needed to create a viable model.

In addition, Department of Transport and Main Roads has partnered with the University of Sydney to study the scaling features needed for a local MaaS ecosystems in Australia. This research directly supports the consideration of governance models needed to support the ecosystem and customer facing apps.

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[15] https://lvm.fi/en/-/act-on-transport-services-955864

Netherlands (NL) – The 7 nationwide pilot projects

In the Netherlands, the Ministry of Infrastructure and Water Management secured a framework agreement for the launching of seven regional pilot projects for Mobility as a Service (MaaS) services.

The agreement attracted 41 consortia, 24 of which were awarded a contract, including parties that are already actively involved in mobility sharing or with MaaS in some way, such as IT and platform parties, banks and insurance companies, start-ups, and public transport, mobility and automobile companies.

These pilot projects aimed to study the MaaS ecosystem in detail and identify potential benefits in terms of environmental, social and transport sustainability, and comply with common rules, transparent conditions, and requirements set by the Ministry to ensure scalability and integration from a regional to a national context.

As part of this framework, the Dutch government has developed a technical standard called TOMP-API and an OpenWheels modal contract for transport operators and MaaS providers.

Some municipalities in the Netherlands even demand the use of TOMP-API to make it easier for MaaS providers to include more transport operators in their service.

This standardised approach and regulations aim to set up an (inter)national MaaS ecosystem that can be sustainable for all stakeholders.[16] [17]

Antwerp (BE) – Smart Ways to Antwerp

Smart Ways to Antwerp is a MaaS project launched in 2018 by the City of Antwerp and the local transport company De Lijn, with the goal of improving mobility and reducing congestion in the city.

The project is based on an open ecosystem approach, which means that mobility providers are encouraged to integrate with multiple MaaS platforms and share data through APIs.

Specifically, providers are required to integrate with at least three MaaS platforms, two of which must have a B2C offering, and data exchange is mandatory.

While no specific data standard is required, data requests are based on the MDS and GBFS formats where applicable.

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[16] https://dutchmobilityinnovations.com/attachment?file=7qczeMbWTcRrUzL2ExA8ug%3D%3D

[17] https://dutchmobilityinnovations.com/spaces/1105/maas-programma/articles/technology/44118/tomp-api-can-no-longer-be-ignored-within-mobility

The project has been successful in creating a more connected and sustainable transport system in Antwerp and has become a reference for other cities looking to develop similar initiatives. [18]

Department for Transport - MaaS Code of Conduct (UK)

The UK government identified in August 2023 the need for a voluntary, guidance-based approach through a code of practice to enable MaaS Platforms to emerge and mitigate negative effects. The code of practice allowed the UK government to support the trials and to gain evidence for future regulation. Areas covered by the code of practice are:[19]

- Accessibility and inclusion
- Enabling active and sustainable travel
- Data considerations to facilitate MaaS
- Multimodal ticketing
- Consumer protection
- Competition

Best practices

As we have observed through several case studies, here we will see a summary of the best practices derived from existing regulatory frameworks.

Collaboration and Stakeholder Engagement

Successful regulatory initiatives involved collaboration between various stakeholders, including government agencies, MaaS providers, transport operators, mobility service providers, local authorities, and data brokers.

Engaging these key players in the regulatory process fosters a collective effort to create effective MaaS solutions (e.g., Belgium's Flemish MaaS agreement framework).

Emphasis on Sustainability

Several initiatives prioritized sustainability by encouraging combined mobility and eco-friendly travel options.

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[18] https://www.polisnetwork.eu/wp-content/uploads/2021/06/1.A.-Stijn-Vernaillen.pdf

[19] https://www.gov.uk/government/publications/mobility-as-a-service-maas-code-of-practice/mobility-as-a-service-code-of-practice#summary-of-recommendations

This includes enabling users to seamlessly combine different transport modes, promoting the use of public transport, and reducing congestion and pollution (e.g., Belgium's Flemish MaaS agreement framework).

Data Openness

An essential aspect of these best practices is the requirement for data sharing among different stakeholders.

Open data standards, data exchange through APIs, and interoperability of ticketing and payment systems are common themes.

Openness also facilitates the integration of various transportation and mobility services into MaaS platforms. (e.g., Antwerp's "Smart Ways to Antwerp" project).

Standardization

The adoption of standardized technical specifications, such as TOMP-API in the Netherlands, plays a crucial role in ensuring interoperability and scalability within MaaS ecosystems.

Standardization simplifies integration processes and enhances user experiences (e.g., the Netherlands' nationwide 7 MaaS pilot projects).

Customer-Centric Focus

Providing value to customers by offering convenience, accessibility, and multi-modal travel options.

It's crucial to recognize the different needs of travelers and strive to enhance the overall customer experience (e.g., Finland's "Act on transport services") and the UK MaaS Code of Practice which reinforces the need for services to be accessible and available to all types of users.

Conclusion

By identifying and emphasizing these common points, policymakers and MaaS stakeholders can establish a strong foundation for designing effective regulatory frameworks that promote the growth and success of Mobility as a Service.

Ideal Regulatory Initiative and Future Enhancements

Based on the insights gained from successful regulatory initiatives worldwide, the ideal regulatory framework for Mobility as a Service (MaaS) should embrace collaboration, sustainability, data openness, standardization, and customer-centricity.

This framework should encourage cooperation among government agencies, MaaS providers, transport operators, mobility service providers, local authorities, and data brokers to foster a collective effort in creating efficient MaaS solutions.

Sustainability should remain a core focus, promoting eco-friendly travel options and seamless integration of various transport modes.

Data openness must be enshrined, with open data standards, APIs for data exchange, and interoperability of ticketing and payment systems to facilitate integration into MaaS platforms.

Standardization is crucial for ensuring interoperability and scalability within MaaS ecosystems. A standardized approach simplifies integration processes and enhances the overall user experience, creating a robust foundation for an international MaaS ecosystem.

To further improve regulatory initiatives, a relentless focus on customer-centricity is essential. This means providing value through convenience, accessibility, and multi-modal travel options.

As MaaS continues to evolve, future enhancements should consider the following:

1. **Interoperable Global Standards**: develop globally recognized and interoperable technical standards to facilitate cross-border MaaS services, ensuring a seamless experience for travelers worldwide.

2. **Dynamic Data Exchange**: encourage dynamic data exchange between transport operators and MaaS platforms to provide real-time information on routes, schedules, availability, and disruptions, enhancing user convenience.

3. **Integrated Payment Systems**: implement integrated payment systems that allow users to pay for various transport modes within a single MaaS platform, simplifying the payment process.

4. **Open Procurement and Innovation**: promote open procurement processes that encourage innovation and competition among MaaS providers, avoiding vendor lock-in and fostering a diverse ecosystem.

5. **User-Centric Regulations**: continuously gather user feedbacks and preferences to adapt regulations and MaaS offerings to meet evolving customer needs.

By striving for these enhancements and maintaining a user-centered approach, regulatory bodies and MaaS stakeholders can ensure the continued growth and success of Mobility as a Service on a global scale.

Further references

- Pollicino, Oreste and Lubello, Valerio and Stojanovic, Aleksandar; Regulating Mobility-as-a-Service (January 18, 2022); Global Community Yearbook of International Law and Jurisprudence, 2022, Bocconi Legal Studies Research Paper No. 4011633, Available at SSRN: https://ssrn.com/abstract=4011633
- Mitropoulos, L.; Kortsari, A.; Mizaras, V.; Ayfantopoulou, G.; Mobility as a Service (MaaS) Planning and Implementation: Challenges and Lessons Learned. *Future Transp.* **2023**, *3*, 498-518. Available at https://doi.org/10.3390/futuretransp3020029
- https://nordicroads.com/regulatory-frameworks-and-maas-developments-in-finland-and-norway/
- https://www.mobility-payments.com/2022/03/10/maas-expert-mobility-as-a-service-initiatives-on-wrong-track-new-framework-needed/

Chapter 3: Current landscape

In this chapter we consider how transport services and MaaS are currently structured within a range of options for ownership, regulation and commerciality. It is important to be aware of the role of Maas as an ecosystem within the overall transport landscape, and not "merely" an app. By itself MaaS cannot make transport cheaper or more sustainable but it can enable these aims and objectives. While MaaS can help to effect changes in customer travel behaviour it can only do so with the actual provisions of transport; and while MaaS can help to enhance transport provision it will only ever be a marginal contributor.

MaaS has complex interactions with each of these dimensions, posing questions like:

With transport operators:

- What tickets will be available, at what prices and with what commission?
- Will any new tickets, joint tickets or subscription models be available?
- What contractual arrangements on data sharing, fraud and customer services need to be put in place?
- How to arrange reconciliation, settlement, ticket acceptance and validation?
- Whether multiple MaaS platforms can retail tickets for multiple operators in multiple geographies?
- To what extent will MaaS help to grow the overall market rather than subtracting market share from existing operators?
- What are the benefits to operators, including better data, joined up marketing, customer information, better interchange between modes?
- What are the costs to operators, including initial integration costs, processing costs, potential loss of control?

With Government agencies:

- What is the business case for MaaS? Strategic, economic, financial, management and commercial?
- What are the expected costs and revenues for MaaS: in the short, medium and long term?
- Who are the customer groups, and do they align to priorities for the government agency?
- What are the social / economic benefits achieved by MaaS?
- How can a MaaS platform become an asset and not a liability?
- Does the MaaS platform contribute to the transport strategy and vision for the region? How?

- Is there a link between physical infrastructure such as mobility hubs, and digital tools like MaaS?
- What is the operational protocol for MaaS? Where in the organisation does it sit, and do those people know about it and want it?
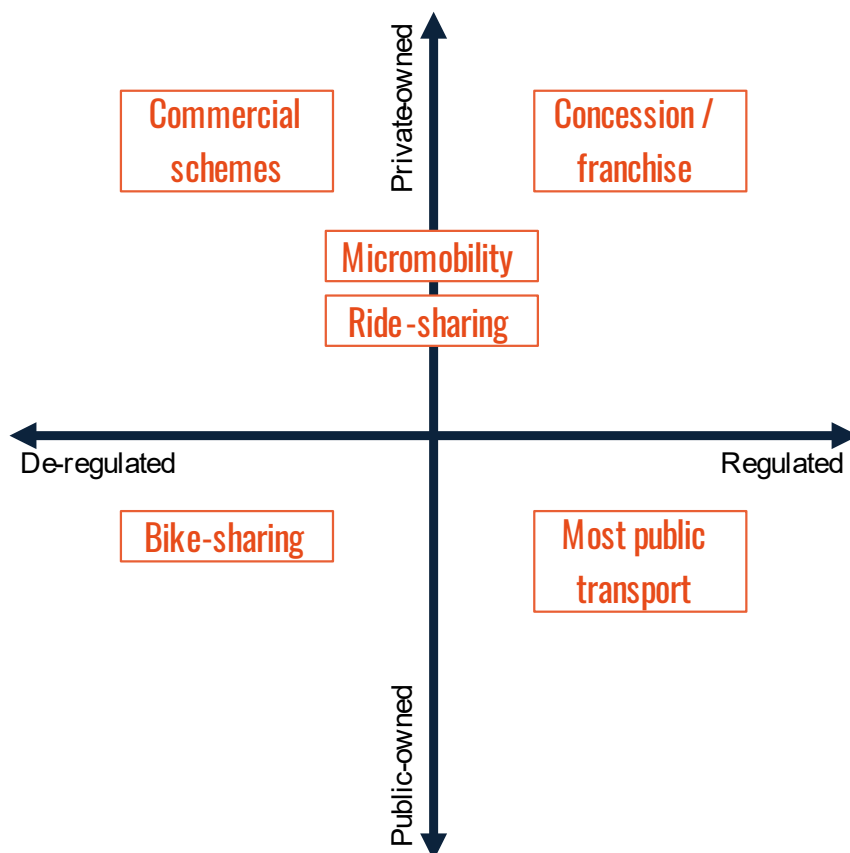
With customers:

- What do customers want and need from transport? Why and how is MaaS the answer?
- What are the different customer needs while making different trips?
- How can accessibility and multi-modality be included from the start, or later?
- How can MaaS provide value even for car users? (e.g. through ride-sharing, parking, EV charging, P2P rental, suggesting park&ride options)
- Can MaaS offer customers anything they do not already have, other than convenience and centralisation?

Transport modes, services and operators

The landscape of MaaS relating to transport modes and operators is that a variety of models relating to ownership, operations and commerciality are already in play.

Regulation

Transport providers may be regulated or deregulated; public-owned or private-owned. The table below shows the possible combinations and how this affects the leverage of Governments on operators.

A 2x2 matrix with vertical axis from Private-owned (top) to Public-owned (bottom), and horizontal axis from De-regulated (left) to Regulated (right).

- Top-left: Commercial schemes
- Top-right: Concession / franchise
- Centre (private, near axis): Micromobility, Ride-sharing
- Bottom-left: Bike-sharing
- Bottom-right: Most public transport

Deregulated and private-owned	Regulated and private-owned
These operators choose where, when and how to provide services. They may receive some public funding (usually for specific services) but they usually operate on a commercial basis. Governments have little leverage with these firms because of the lack of regulation and public funding. These services may be public transport but are often also ride-sharing, micromobility or car clubs.	These operators are contracted to provide services under a concession or franchise model. Their sources of revenue are from fare revenue, taxes or subsidies and can also be from private investors. Governments enjoy considerable leverage over these firms because of the role of regulation and contracting. These services can be public transport but also (where legislation permits) micromobility, car sharing or ride-sharing.
Deregulated and public-owned	**Regulated and public-owned**
This combination is most likely to arise in something like a city bike sharing scheme,	These bodies both set and operate public transport, with funding sources both from

which is owned by the public authority but not subject to public transport regulation. Governments have complete leverage in this scenario as long as they can approve internal decisions.	fare revenue and from taxes, subsidies or other public sources. Governments have near-complete leverage in this scenario, although internal decision-making can still be challenging at times.

Types of service

MaaS can encompass a wide range of transport services, which combine to give a solution greater than the sum of its parts.

Model	Description	Commercial value and ownership
Public transport	This is usually the core of a MaaS platform as it not only forms the backbone of services in a region but has positive policy and sustainability effects from its promotion. Depending on the local geography it can include buses, trams, rail and ferries.	Can be owned privately or publicly. Commercial value is usually subsidised but with significant other benefits.
Micromobility	In recent years, bikeshare schemes have expanded or been complemented with e-scooters and in some places e-mopeds. Together these are considered as "micromobility" and this loose definition could expand to include future modes of transport not yet introduced.	Can be owned publicly (city bikeshare schemes) or privately (either individually or through sharing schemes). Commercial value is typically very low per trip with slim margins and operating costs which are closely related to specific scheme operations.

	Whereas the first generation of bikeshare schemes were owned or tendered by public authorities, recent generations of micromobility are dominated by the private providers including Voi, TIER, Lime, Dott, Beryl etc. The market is rapidly consolidating with more failures and acquisitions likely in future.	
Taxi, private hire and ride-hailing	This mode includes traditional taxi firms, private hire (where this is legally different from taxi) as well as ride-hailing firms like Uber and Lyft. They are subject to varying levels of regulation according to local law.	Privately owned but can be regulated by Governments. Typically more expensive per trip with some provision for profit, greater or lesser depending on the geography.
Car rental & Car share	This mode includes traditional car rental and also more recent car clubs. These services are all private and tend to be deregulated apart from more general regulations.	Privately owned. More expensive options per trip with provision of profit.
Private motoring	In most places, the private car is the dominant transport mode most of the time (in terms of vehicle kms) – including in a lot of big cities. Governments have existing levers to control car use including parking charges, road space reallocation, congestion	Privately owned. Can generate significant revenue for Governments through fuel tax, vehicle tax, parking charges etc. - but these are usually to overcome the significant societal costs created by pollution, collisions and non-dense land use planning.

	charges and low emission zones. Many car owners and drivers will use vehicles to pick up or carry bulky items from time to time, which is sometimes considered a barrier to reducing car ownership.	
Walking and cycling	Although these modes are not regulated they are relevant in this discussion because they offer substantial health and sustainability benefits and benefit from exposure in MaaS journey planners.	No ownership or restrictions on walking (other than access restrictions), and limited commercial value except the monetisable values of health benefits from active travel, advertising to pedestrians and clothes / shoes.
Peer to peer	These emerging models allow people to share vehicles (usually cars) for ride-sharing on individual journeys or renting from one individual to another.	Privately owned vehicles, with privately owned services enabling the sharing between people. Some commercial potential depending on profit margin.
Supporting services	All of these transport services are underpinned by a wide range of supporting services including the ownership and maintenance of highways and railways, the provision of parking and interchange, ticketing systems, recharging and refuelling services and institutional knowledge.	Typically publicly owned and often these costs are hidden or combined with other services. MaaS would not be possible without them.

Competition and State Aid

In many places, the transport industry is significantly competitive between operators and with Government agencies. Especially post-Covid where travel patterns have changed significantly, there are challenges of finding customers and maximising revenue.

Transport operators can compete against each other, for example where privately-owned micromobility companies operate in the same city and compete for the same customers. In some markets (especially the UK) where private companies run bus and rail services, there is competition between these providers – although this is reducing with changes to regulations.

Transport operators also compete against new technologies, modes or booking platforms, for example where the rise of Uber has been a significant challenge to taxi companies and taxi drivers in many cities.

In some cases, these competitive issues lead to anti-competitive behaviour which stifles innovation, or to pressure for new Government regulations which limit innovation.

There are legal restrictions on Governments providing unfair advantages to one operator over another (known as State Aid). This includes transport operators and also MaaS platforms, which means that and procurements or contracts have to be fair and transparent.

Procurement and sourcing of MaaS

In order to launch a MaaS platform, there are a variety of possible routes to market.

First, a private company may seek to launch a MaaS platform with no involvement from public agencies. Such a company would need to secure agreements for integration from all the transport operators in the region as well as the supporting services such as data, payments and customer services. MaaS Global was the original provider in this space although it has proved challenging to be financially sustainable. Axon Vibe have also launched a platform in this model.

Secondly, a government may enable the development of MaaS through soft or hard regulation without procurement. This can include preferring or mandating data sharing, open ticketing or other integrations which are critical to MaaS platforms succeeding.

Thirdly, and more commonly, a public authority will fund a MaaS platform and either develop one itself or tender this service to an external provider. Some of the key considerations and issues faced here are:

- Skillsets, and whether to "build or buy" a MaaS platform. Only the most technologically advanced public agencies will have the skills to build a MaaS platform in-house, and many agencies struggle to have the expertise to be an intelligent client buying a MaaS platform as well (without third-party support).

- The requirement for capital funding to develop a MaaS platform and (often) the requirement for operational funding to keep a MaaS platform running. These can have different budgeting rules. For public authorities which can attract grant funding for capital projects, there could be a temptation to build a MaaS platform – but without either ongoing funding or the chance of profitability this could be wasted investment. Ongoing licence fees should be considered at an early stage.

- Whether the authority has the resources to own relationships with Mobility Service Providers or expects the MaaS provider to own these relationships. Typically, the authority owning the relationship with public transport agencies will lead to more trusted and positive outcomes; while private mobility providers (micromobility, car share etc.) may be happy to integrate with MaaS providers under the auspices both of public and private bodies.

- In some cases, grant funding or research can provide seed funding to allow the development of a MaaS platform, but the issues around ongoing funding persist and without a long-term business case, these platforms are not sustainable.

- In some areas, there could be geographical or legislative restrictions around the scope and scale of a MaaS platform; for example whether it is permitted to grow to new regions. This can be a critical factor in commercial success in the long term.

- Whether to adopt a "solution-driven approach" with many precise and exacting requirements, or a "challenge-driven approach" which sets out the outcomes and impacts the agency is seeking to achieve. The latter is more likely to result in a dynamic tender and wider range of prospective providers, but can make a procurement process more challenging. Agencies can consider using a "MoSCoW" analysis to identify features it Must have, Should have, Could have and Won't have. These requirements should be developed in conjunction with end-users.

- Stakeholder management. There are typically many stakeholders both internal to the Government agency and in partner authorities or operators who must be engaged and agree with the approach. Agencies who begin this process early and obtain formal approval early have been shown to progress quicker in later stages of development.

- Intellectual Property (IP). Many Government agencies will have standard terms which stipulate ownership of IP but these are typically not best-suited to MaaS platforms especially with a Software-as-a-Service (SaaS) model. The ownership of IP and

ability to use IP should be considered, both initially and in future; this includes any divisions between IP owned by the commissioning body (such as branding) and that owned by the MaaS platform provider (such as API integrations).

- Transparency and Freedom of Information. Procurements should be run in an open way which encourage participation by multiple prospective bidders and in which information is not concealed.

Payments

- MaaS platforms need to be integrated with a Payment Service Provider (PSP) and Merchant Acquirer bank. In most cases, Governments will already have agreements with these which can be used for MaaS but may require attention for specific cases especially if subscription models are used instead of Pay as you Go.

- A MaaS platform can integrate with multiple PSPs depending on the model used.

- The process of dealing with refunds needs to be considered, along with who takes liability in the case of delays, disruption, failed trips or processes.

- The frequency and process of settlement and reconciliation needs to be defined and agreed with all agencies and operators as well as the PSP. This is complicated further, if models such as subscriptions are used where complex reconciliation calculations are required, more than whether the MaaS platform sells existing tickets.

- A dispute resolution process with transport operators will also be needed. It will require accurate accounting of trips and payments from both the MaaS platform and the operator.

- Insurance and liability also need to be considered, especially in the case where an accident or incident occurs and a question arises about the difference between the ticket retailer and the transport operator.

Mapping regulations by sector

The table below shows some examples, by area, of the current regulations which affect MaaS, and the gaps that exist. This list is not intended to be exhaustive but to act as a guide for further research.

Area	Existing regulations (which may be national or regional)	Gaps
Data	GDPR UK Data Protection Act National Access Point Equitable data sharing MMTIS EIDAS 2.0	Data standards (and where they do exist, competing standards)
Competition	UK Competition Act, requires an exemption for operators to collaborate on a joint product State Aid	A framework that allows MaaS platforms to develop and offer new economically sustainable customer propositions
Payments	PCI DSS EU Regulation on Rail Passenger Rights	Consistent approaches around payment reconciliation, particularly in the event of travel disruption
Transport operators	Accessibility Regulations Licencing Safety Equality, Diversity, Inclusion requirements Public Transport Service Obligations Fares and pricing Taxi and private hire rules French Mobility Belgian Code of Conduct UK MaaS Code of Conduct German Mobility Data Ordinance UK Ticketing & Settlement Agreement	Inconsistent regulations between modes – some modes heavily regulated, others not which creates market distortion. Regulations differ between countries
Procurement / commercial models	OJEU and PCP UK Procurement Law (Public Contracting Regulations 2015) US Procurement Law	Proven procurement and commercial models for MaaS between public and private sector

Labour	Conditions for ride-hailing drivers or micromobility operatives	Inconsistent treatment of labour laws between modes
Banking, finance and tax	UK / Singapore Banking Regulations: the impact of holding credits on account PSD2 Subsidy rules VAT and its applicability for different transport modes Germany: cross-financing public services Germany: subsidies and different tax rates Germany and Italy: micro-subsidies to users	Inconsistent approach to subsidy between modes Funding rules for public and private sector operations with regard to external investment UK: micro-subsidies to users and tax consideration of mobility credits
Customers	EU261 and equivalent for land public transport Duty of care UK Consumer Rights Act UK ICO Data Privacy Act Data Governance Act AI Act	Responsibility for customer care Clarity on retailer vs. Operator for public transport
Accessibility	WCAG requirements Equality Act Equality Directive	Application of accessibility requirements to MaaS, particularly for those with limited digital capabilities

Chapter 4: The role of sandboxes

Introduction and definition

Trialling untested initiatives in the transport industry is challenging in environments where frameworks for funding, procurement, operations and evaluation are often based on longer-term, more traditional and slower-paced projects. This creates problems of high barriers to entry for new market participants, coupled with the inability to shape regulation in an agile way suitable for a fast-moving industry sector.

A regulatory sandbox is defined as a "safe space" for regulation, where changes can be tested in a supportive environment. These changes could encompass tools, products, regulations, physical products, services or business models.

To succeed, a sandbox requires a clear **mandate**, **sponsorship** and support from the relevant central and/or local Government bodies, **capability and resources** to execute plans, **funding** to set up and run, and the support of a wide range of stakeholders across the public and private sectors.

The governance arrangements for a regulatory sandbox would be likely to include:

- Co-creation by local and national Governments with industry stakeholders and subject matter experts including user representatives

- A partner forum to bring together the stakeholders and ensure their views are taken into account, initially and over the long term

- A programme board to oversee the delivery of the sandbox and its initiatives, and provide a governance framework for reporting

- A robust monitoring framework to create and execute evaluation plans for individual projects and wider programmes (including independent review)

The applicability of a sandbox to MaaS

The problems faced by MaaS with regard to regulations is described in previous chapters, and could be summarised as:

- Overlapping and changing suite of regulations from local, national and international bodies

- Regulations are designed for other transport initiatives and prohibit, rather than enable, MaaS and its related developments

- Lack of data exchange using codified standards and methodologies

- Lack of payment integration and regulation permitting new modes of payment and mobility conceptions

The use of a regulatory sandbox for MaaS, then, could include the selection of a geographic area able to meet the governance arrangements described above, with either an active MaaS platform or plans to create one, and a robust stakeholder environment which would make the most of the regulatory changes created by MaaS.

The specific benefits which could accrue from, or be tested in, a sandbox could include:

- Changes to tax regulation to enable mobility credits to be classified in the same tax bracket as a car payment or other employee benefit, with tax advantages

- Agreements on data standards and data exchange to take place in the region, including the requirements on how to provide, ingest, manage, export, share and protect data

- Commercial agreements between public sector and private sector bodies on the role of MaaS as a payment aggregator, able to take commercial risks by trialling bundles or subscription models for MaaS

- Trial different business models and customer propositions that require new or updated regulations

Conclusion

The use of regulatory sandboxes for MaaS could accelerate the provision and evaluation of new models of mobility which are hitherto either untested or not developed fully. The findings from this sandbox could be shared more widely, and the sandbox region itself would benefit from the early adopter advantage of a reputation as an innovative region.

Chapter 5: Recommendations

In this chapter a series of recommendations are proposed, based on opportunities and gaps.

Recommendations for Regulators

The wide range of existing regulations across countries and regions in the areas mapped in Chapter 3 mean that it is challenging for MaaS platforms to meet their obligations. A more refined and unified set of regulations would make this process simpler and give greater protection to customers, provide greater opportunity for commercial success and give greater support to transport operators.

Recommendations for Government agencies seeking to launch MaaS

There are several recommended steps here:

1. Be aware of the range of regulations affecting MaaS and the choices which need to be made.

2. Learn from best practice case studies which are emerging globally and learn lessons from less successful projects.

3. Balance the needs of stakeholders including customers, transport operators, businesses and others.

4. Consider the role of procurement and how it can be best shaped to give a positive result and avoid being locked-in to one provider or service model.

5. Promote the use of regulatory sandboxes to trial innovative approaches to procuring, tendering and operating MaaS.

Recommendations for MaaS platform providers

There are several recommended steps here:

1. Engage openly with Government agencies with "best practice" in procurement and regulation, to enable lessons to be learned between agencies.

2. Harmonise development in accordance with emerging standards and avoid creating vendor lock-in or walled gardens.

What the MaaS sector should be doing to inform regulatory design

The progress of initiatives such as MDMS is a good opportunity for the MaaS Alliance and other interested parties to make clear the benefits of MaaS and of well-crafted regulations which enable MaaS: these could include the role of data sharing, open ticketing and retail platforms, and streamlined and unified payments standards.