The MaaS Dictionary

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1. The MaaS Dictionary

Term	Definition
MaaS: mobility-as-a-service	Mobility-as-a-Service (Maas) is a user-centric, intelligent mobility management and distribution system, in which an integrator brings together offerings of multiple mobility service providers, and provides end-users access to them through a digital interface, allowing them to seamlessly plan and pay for mobility.
MaaS Operator (integrator)	The MaaS Operator is the organisation that integrates the mobility service providers' offerings, designs the MaaS Products and sells them to end-users. There could be one or several MaaS Operators in a given area and an operator can provide services across multiple areas.
IT Providers (IT=Information Technologies)	IT providers are the organisations that are responsible for the data and the IT infrastructure. This includes, but is not limited to, payment, ticketing, telecommunications, technical backend, the MaaS platform. The MaaS Operator can also be one of the IT providers.
MaaS Platform	The MaaS Platform is the IT structure that is used by the MaaS Operator to provide the final service of mobility to the end-users. The MaaS Platform is split into two elements: the front-end and the back-end, all of which are made up of components developed by the IT Providers. The Front-End is the customer-facing element. It is the digital interface which is a mobile and/or web application, which customers interact with to purchase and use MaaS Products. The Back-End is the internal support element, enabling the delivery of MaaS. It is a collection of components which perform integral functions such as data import, data storage, journey planning, optimisation, ticketing, payment and communication.
MaaS Platform Provider	The MaaS Platform provider is the company responsible for providing the MaaS Platform. This could be the MaaS Operator or a third party responsible for just the technological elements.
MaaS Digital Interface	The MaaS Digital Interface is a mobile and/or web application, which customers interact with to purchase and use MaaS Products.
Mobility Services	Mobility Services are all of the elements of the system which enable people to travel. This includes, but is not limited to, the transport modes and mobility supportive services. Where, transport modes are the types of services provided to end-users by transport operators (e.g. car-sharing, ride-hailing, taxi, bus, rail, etc.).
Mobility-supportive Services	Mobility-Supportive Services (MSS) are the elements of the physical infrastructure which support mobility services. This includes, but is not limited to, charging stations, fuelling stations, parking spaces.

Mobility Service Providers (MSPs)	MSPs are the organisations, be it public or private, which provide mobility services to the MaaS operator and end-users.
Multiservice Journey Planner	The Multiservice Journey Planner is a specialised search engine which provides optimal means of travelling from A to B. The planned journeys are optimised for certain criteria important to the end-users (speed, cost, comfort, distance). The Multiservice Journey Planner provides a combination of as many of the modes that can provide the best journey to the end-user.
MaaS Business Ecosystem	MaaS Business Ecosystem is the wider network of organisations that influences how a MaaS Operator creates and captures value.
MaaS Product	The type of service offered by a MaaS operator to its customers. This includes, but is not limited to, Pay-as-you-go services and MaaS Plans.
MaaS Plan	MaaS Plan is a MaaS Product. The bundled Mobility Services and Mobility-supportive Services that are offered by a MaaS Operator to its customers. The bundle includes the amount of usage, the cost of travel and the duration of subscription.

2. The MaaS concept

The Mobility as a Service concept is defined as: "Mobility-as-a-Service (Maas) is a user-centric, intelligent mobility management and distribution system, in which an integrator brings together offerings of multiple mobility service providers, and provides end-users access to them through a digital interface, allowing them to seamlessly plan and pay for mobility." A representation of this definition is presented in Figure 1.

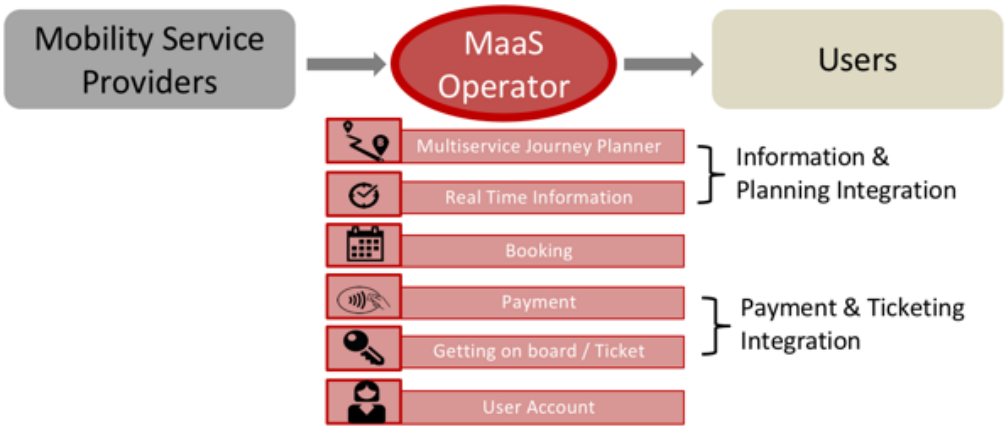

Figure 1: The MaaS Concept

The MaaS operator is an intermediate between Mobility Service Providers (MSPs) and users. MSPs are the organisations, be it public or private, which provide mobility services to the MaaS operator, as depicted in Figure 2. While currently only the transport operators are considered in the supply side, other companies could also enter the MaaS arena. For example, mobility supportive services providers (such as fuel providers, parking or high-way operators), and entertainment services providers (such as Wi-Fi providers or movies and games providers) could be considered as MaaS suppliers as well. Once the MaaS operators start offering their services, more and more ideas will surface to improve user experience. In addition, all these services will make even more sense in the autonomous vehicle era, as it is expected that travellers would have the opportunity to do plenty of other activities instead of driving. The MaaS operator uses the data that each MSP offers (via secure APIs), buys capacity from the MSPs and resells it to users.

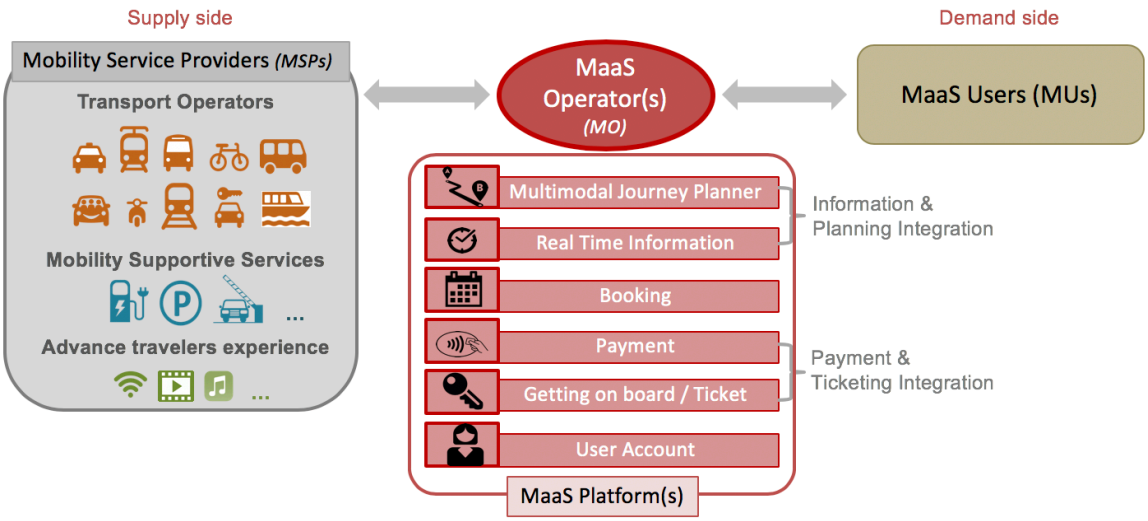

Figure 2: The suppliers of the MaaS Concept

The users only use one interface to find information and choose the preferred transport mode for their trips. The MaaS operator can propose the ideal combination of transport modes to them for each trip by knowing the network conditions in real time (supply side) and the preferences of users (demand side). In other words, the MaaS operator can optimize the supply and the demand. Some also envisage that MaaS could not only bridge the gap across MSPs in the same city, but also across different cities, which may initiate the idea of roaming in the transport sector. It is common for someone to live outside the major city of GZM (usually due to better quality of life or properties prices) and commute to Katowice. MaaS providers could cover the travel needs of their customers not only in Katowice, but anywhere within the GMZ Metropolitan area and around the world where they operate, as presented in Figure 3.

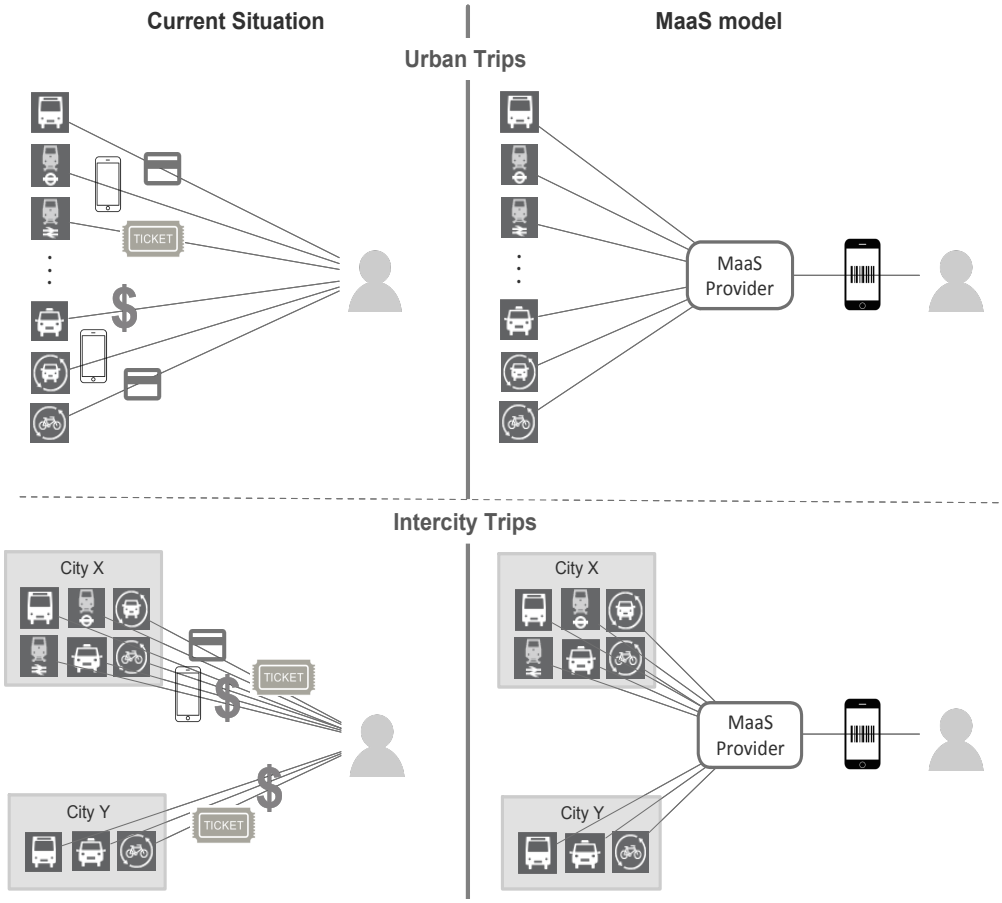

Figure 3: Mobility roaming via the MaaS concept

The MaaS concept covers several concepts that have been extensively discussed in the transport sector during the last few decades. These are the integration, interconnectivity and optimization of transport services, smart and seamless mobility, and sustainability. The MaaS concept also includes concepts that have recently emerged via the Internet of Things and the sharing economy, such as the term “as a service” and personalisation. Although there are already mobility services that cover these terms (i.e. car sharing, on-demand transport), they usually operate in silo and are not integrated with other modes - especially with public transport. MaaS envisages enabling a co-operative and interconnected single transport market and providing users with hassle free mobility.

3. The MaaS Business Ecosystem

The business ecosystem of the MaaS provider consists of several actors, including:

1. transport operators and in general mobility service providers
2. data providers,
3. technology and platform providers (technical back-end providers),
4. ICT infrastructure,
5. insurance companies,
6. regulatory organisations,
7. universities and research institutions.

As the MaaS ecosystem evolves other actors could also be added, such as media, marketing and advertising firms, unions and other standardisation bodies. But for the purposes of this report, the focus is allocated only on the actors that could enable or disable the concept at its first steps. The MaaS ecosystem is presented in Figure 4.

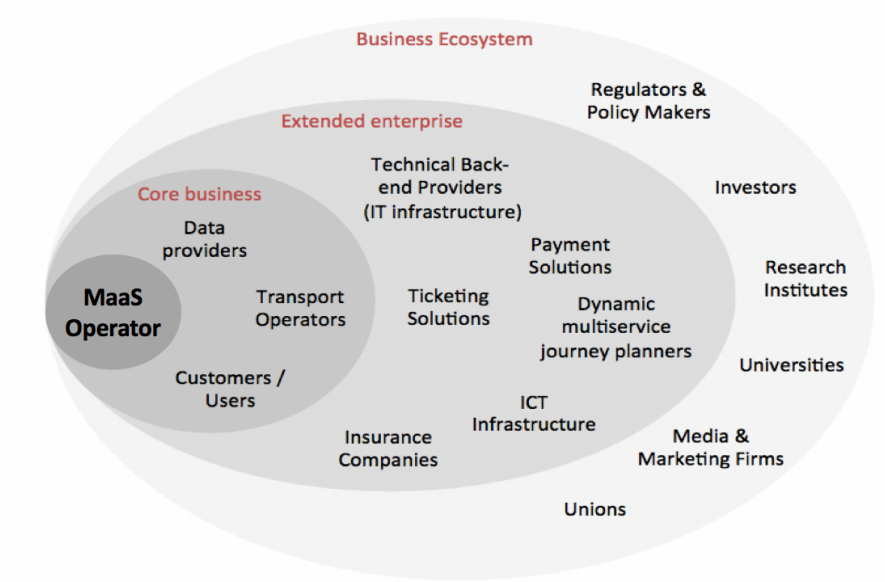

Figure 4: The MaaS Business Ecosystem (Source: Kamargianni and Matyas, 2017[1])

The ecosystem's core business layer consists of the MaaS operator (the focal firm) and the parties forming the heart of the business: the business network actors such as suppliers and customers. In the case of the MaaS operator, the core business parties are the transport operators-MSPs, the data providers and the customers. The next layer, the extended enterprise, widens the view of the business supply chain to include the complementors and second-layer suppliers. In the MaaS ecosystem these are the technical back-end providers (IT infrastructure providers), firms offering ticketing and payment solutions, ICT infrastructure, and insurance companies. The outermost layer, the business ecosystem, adds regulators, unions, universities and other research bodies, investors, and stakeholders to the business ecosystem. Even though they are perhaps not directly involved in the business operations, these parties may have a significant effects on the success of the MaaS model as they provide the policy frameworks and research findings to enable the materialisation of the concept.

[1] Kamargianni, M., and M. Matyas 2017. The Business Ecosystem of Mobility as a Service. 96th Transportation Research Board (TRB) Annual Meeting, Washington DC, 8-12 January 2017.

4. MaaS Technology and Data Requirements

The MaaS concept relies heavily on data availability. The role of the data providers is of critical importance. Data interoperability is also of strategic importance to the MaaS concept and especially to the technical components of MaaS. In order to achieve interoperability, regional as well as national and international data standards and protocols need to be proposed on a central policy level and adopted by the transport operators and MSPs in general. Another aspect to consider here, is the fact that the MaaS concept could be fully enabled by data being openly available. This can be expedited by creating policies and standards that support secure open data and sources.

The data that are essential for the MaaS platforms are transport operators' route data, real time vehicle positioning, real-time network conditions and disruptions, ticketing, booking and payment data. Availability of other data, such as land use, places and weather data, could contribute to the development of MaaS products that further advance customers' experience and satisfaction. Table 2 presents the data required for enabling the MaaS concept.

Table 1: Data required for enabling the MaaS services provision

Essential Data	Optional Data
Fixed routes	Land use & places data
Flexible routes	Weather
Real-time vehicle positioning	Etc.
Real-time network conditions & disruptions	
Ticketing	
Journey booking	
Journey payment and ticketing	

5. Policies and Standards Required for MaaS Initiation

The MaaS concept requires the collaboration of several actors in order MaaS products to be provided to end users. In addition, the development of MaaS platform requires data from several actors, while at the same time the application of the platform(s) and the provision of MaaS products generates a ginormous amount of data. As such, several policies and standards should be first satisfied in order MaaS to be materialised. The below policies and standards should be applied in order MaaS operators to securely operate in each area:

- Passenger Rights
- Consumer rights
- Protection of Personal Data
- National strategies on Open Data and Access principles
- E-ticketing and contactless payment standards
- Fair competition standards
- Checklist for MaaS Operators