



Mobility as a Service (MaaS) is the concept of selling to travellers a personalized package of multi-modal mobility services (carshare, public transport, taxi, bike) that are paid for in one transaction for each journey or time period, not in a separate transaction with each transport provider.

Problem description

Currently consumers buy vehicles and other mobility services (taxi, bus, bikeshare, carshare) separately from different providers and generally for a multi-modal trip the traveller has to arrange each leg of that trip separately. This is complex and can be expensive and because it is quite difficult for consumers to find out about each separate mode and in particular how to arrange the interchange between each one, they may default to the simplest single mode, often the private car even though, in some cases, an alternative would be cheaper, faster or just suit them better. Consequently consumers may be spending money on unnecessary car ownership and use and wasting their own time as well as imposing congestion and pollution on everyone else by their car use. This is also a possible problem for providers of alternatives to the car, since their market may be being reduced due to the difficulty for consumers of making multi-modal journeys.

How does it work

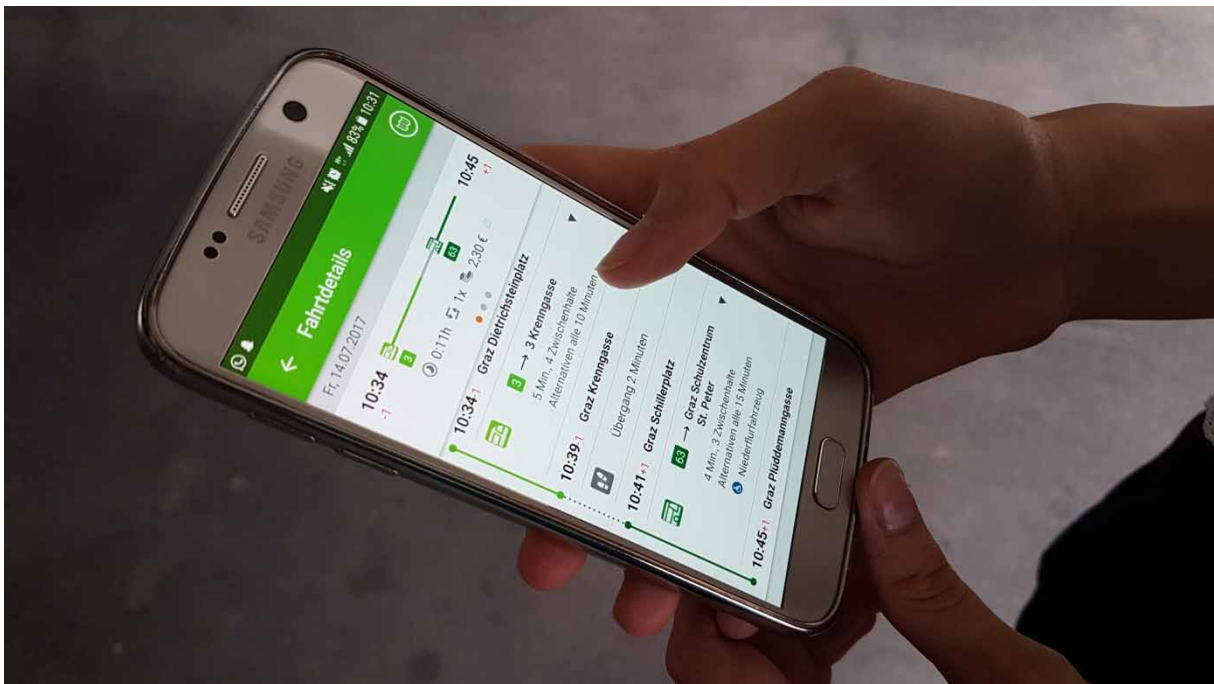
A MaaS provider operates as an aggregator like the “taxi” aggregator Uber or the accommodation “provider” AirBNB. That is, it brings together people who want to travel with companies and operators providing modes of passenger (and potentially also freight) transport. Using data provided and gathered in real time about both travel demand and travel supply, and together with what it already knows about its customers, it assembles journeys for its clients that are as far as possible personalized to their needs (e.g. where they have to go, by when) and also to their preferences (e.g. mode of transport, with whom (if anyone) they want to travel, what other services are provided during their trip and so on). These journeys may be made up of multiple legs operated by separate companies, but to the customer there is just one trip and one point of contact, the MaaS provider, who arranges it all for them. It also arranges a payment package with the client that enables them to pay for the whole trip in one transaction, either for that single trip (pay as you go) or on account, billed weekly or monthly.



Example of MaaS supporting a customer who wants to reduce single occupancy vehicle use (Transport Systems Catapult, 2016:16)

Thus the customer does not pay the operator(s) directly; but the aggregator takes a service charge from customer and/or operator to reflect the value it has brought to both parties by bringing them together and to make money. Importantly, the MaaS aggregator is not a transport operator, in the same way that Uber does not itself operate taxis, nor AirBNB operate accommodation. The costs and risks associated with operation remain with the operators, although the aggregator may play a role if things go wrong and the service is not provided to the consumer to the agreed or expected level by one or more operators.

Currently there is only one full Mobility as a Service operation in the world: MaasGlobal which, somewhat paradoxically, plans to operate only in parts of Finland and the Birmingham area of England at the current time (February 2017). There is on the other hand an enormous amount of hype about the concept due to its potential to significantly disrupt how personal travel is provided and consumed, and thus existing models of transport provision. However the uncertainty surrounding the potential of MaaS is still so great that rather vague statements such as “The UK marketplace for MaaS is estimated as being worth £billions per year” (Transport Catalyst, 2016:28) abound in documents about the concept.



It is helpful to take a step back and consider what the factors are that have an influence on the mode of transport that people choose for a trip and to assess, at least qualitatively, how MaaS may impact on these. This is summarised

in the table below. The factors affecting mode choice are listed in order of importance/influence. It can be seen that the biggest impact of MaaS is likely to be on those factors that have lowest influence on mode choice.

| Factor influencing mode choice | How MaaS might impact on this |
|--|---|
| Journey time | <p>MaaS will not significantly affect journey time by different modes of transport, other than waiting time for taxis and public transport (by providing better real time information and better scheduling of taxis); and probably also reducing parking search time for car users.</p> <p>However, where a traveller values forms of transport where they can use the journey time for other purposes (e.g. work, (virtual) socializing), MaaS will provide more journey options including these forms of transport, thus reducing “wasted” journey time.</p> |
| Cost/price | <p>It is likely that MaaS providers will be able to secure discounts from operators. Against this must be set the need for MaaS providers to make money. The inclusion of forms of carpooling in the MaaS offer will reduce prices where those modes are used (because costs will be shared).</p> <p>In general though for any (multi-modal) journey, MaaS is likely only to deliver relatively marginal cost/price reductions since operators will wish to maintain current levels of revenue, at least until such time as they see that MaaS grows their market to a point where revenue required per passenger can be reduce because passenger numbers have grown.</p> |
| Interchange including multiple fare payment | <p>MaaS will reduce the uncertainty (missed connections etc) of interchange and eliminate the barrier of having to pay for each mode of transport in a multi-modal journey.</p> <p>It will not reduce the inconvenience of physically changing between modes.</p> |
| Like/dislike of a particular mode | <p>MaaS will give a customized offer:</p> <ul style="list-style-type: none"> • It will “know” which travellers prefer certain modes. • It will enable operators to give “try out” incentives to customers to try a mode that they do not normally use; and by providing information about modes “new” to a customer, encourage them to try them out. • It will give operators feedback from users and non-users of their mode to help them to improve their offer. <p>MaaS could here have a significant impact.</p> |
| Inertia (tendency to use mode we always use, especially for regular trips) | <p>MaaS will provide real-time personalized journey information for every trip every day, showing the most advantageous option for that day based on the individual’s preferences. However, the consumer may still choose to ignore this – many studies have shown very low use of travel information for regular journeys.</p> |

An experimental MaaS scheme called UbiGo (www.ubigo.me) in Gothenburg, Sweden, encountered in a sense the result of the factors analysed in the table above. Whilst it developed a full MaaS offering, it found it difficult to recruit test users, particularly from households with a car, because it was difficult for them to see the advantages that MaaS would give them in comparison to their existing car.

Benefits - and for whom they arise

The following benefits could arise from MaaS:

- For users, it could satisfy their mobility needs at the same or lower cost than do their current travel choices, whilst providing them added benefits such as reduced or more useful/enjoyable travel time, trips eliminated completely, and other services made available to them during their travel time. They may themselves be able to use MaaS to rent out their own transport assets (e.g. a little-used car) as part of the “sharing economy”. The hypothetical case study at the end of this section illustrates this well.
- For transport operators, it could increase their market share by giving them better access to and understanding of their markets. However, it could present a competitive threat to those operators unwilling or unable to integrate their offer under a MaaS umbrella.
- For MaaS providers, ultimately the service should deliver a profit.
- For those who collect and store the data about both the supply of transport and users’ travel patterns and preferences, there is the potential to sell this data on to providers of other services who wish to understand and sell into the enormous market of people who are travelling.
- For public authorities, MaaS may lead to reduced car use, but this very much depends on how more competitive with the car MaaS enables alternatives to become. If MaaS stimulates the use of services such as Uber

in place of conventional public transport, this could cause additional car km and congestion; and if traditional public transport operators lose market share because they find it difficult to align/integrate their current way of doing business with MaaS, this will lead to cuts in public transport services. This will have knock-on impacts for people who do not use MaaS, who are likely to include older and poorer people without access to smartphones and credit. On the other hand, for people without current access to a car but who are prepared to use MaaS, it could improve their quality of life by making it easier and cheaper for them to travel.

Hypothetical case study of a family using MaaS

Melinda is 35 years old and lives with her husband and two children in Tyldesley, a semi-rural area about 12 miles north-west from Manchester, where the most convenient transport mode option is the private vehicle. Melinda’s household owns two cars. Her husband, Tom, uses one of the vehicles every day to commute to his workplace at Salford, which is 10 miles away and usually takes him a minimum of 35 minutes, but in some cases up to 60 minutes. Melinda uses their other vehicle to drop the children at school in Bolton and then drives back to Tyldesley to her workplace. Both Melinda and her husband suffer a lot of traffic problems when driving and decide they want a change.

Melinda’s family subscribe to a MaaS offering in an attempt to make their daily travels less stressful. She first downloads the MaaS Provider’s app to her and her husbands’ smartphones, and opens their family account. During the registration, she answers a number of questions and the MaaS app offers her and her husband a ‘Family Package’; which she finds very appealing. The package includes national rail, bus, on-demand mini-bus and bike sharing.

Disadvantages, dangers

Some disadvantages with respect to possible impacts on congestion were listed in the previous section.

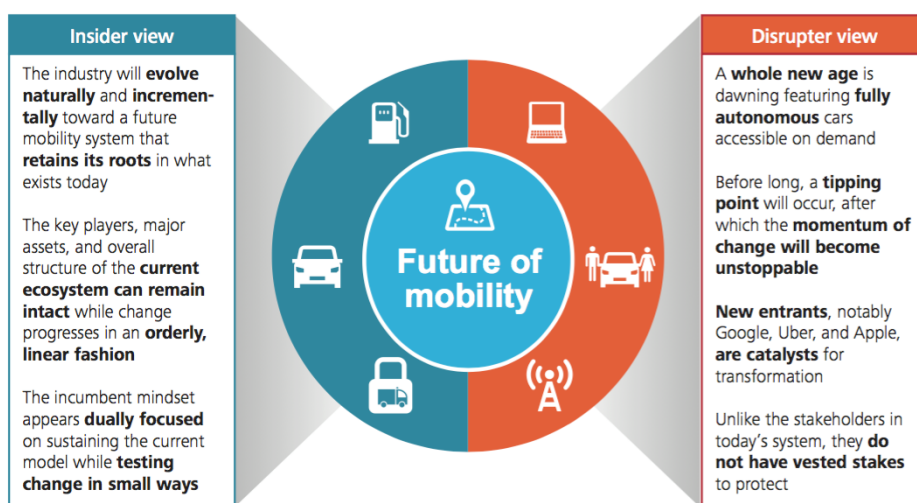
Additionally, MaaS aggregators are likely to be multinational companies who can because of the virtual nature of their operation locate in countries with low corporation tax and pay minimal tax on the revenue they earn in countries where in fact the majority of their business takes place. This is a disadvantage of the aggregator model in general for countries that may wish to raise a tax on business activities to help to fund the social infrastructure from which those businesses themselves benefit.

MaaS is likely to develop or foster some forms of transport provision (such as Uber, or peer to peer carsharing) that existing regulatory systems are not well-placed to deal with. For countries and cities that see regulation as something necessary to promote goals such as public safety or environmental protection, this is clearly a disadvantage of MaaS.

Stakeholder analysis - who are drivers, who are opponents

Drivers: in general, these are organisations interested in free markets and better customer service. In addition, those organisations such as Google and Amazon who want access to data about our travel patterns and personal preferences in order to sell us ostensibly related “personalized experiences” are interested in MaaS because it will generate this kind of data and is more likely to give them access to it.

Because MaaS is a new and largely untested concept, with the only few sites close to actual operation (e.g. in Finland <http://maas.fi> and Germany <http://www.uitp.org/news/maas-hannover>. Further examples can be found in CIVITAS Insight N°18), then it has not really attracted any opposition. The most likely future opposition is likely to come from operators that currently enjoy some regulatory protection and who perceive MaaS as a threat to this; and from those operators who cannot work out how to integrate their existing business model with MaaS.



“Insider” and “Disrupter” views of the future of mobility. (Deloitte University Press, 2015:5)

Legal framework

Since MaaS proposes to integrate and sell mostly existing transport services run by existing operators, the operations that actually carry the passengers would be largely covered by existing legislation. The MaaS service of integrating and selling all these services in a package is affected by laws covering such aggregation services; since such services are new, the legal and regulatory framework is unlikely to be developed enough to deal with it. An important consideration for national legal frameworks is how to get the right balance between regulation (for public policy goals) and liberalization, to allow a free market approach to MaaS. In addition, the legal framework needs to protect consumer rights when they used MaaS; existing legal systems may not be capable of this.

Policy options for cities

The policy options for cities will vary to some extent from member state to member state depending on the regulatory and legislative framework for MaaS and the degree to which the City

administration itself has any regulatory autonomy over such issues, or whether they are controlled entirely at that national level. A policy option of ignoring MaaS would likely be unwise since if nothing else certain stakeholders will lobby the city to take a position on MaaS. If the activities suggested in the section “How and where does it fit with SUMP” are carried out then this will help to develop suitable policy options in collaboration with others who have a stake in MaaS.

Good/bad practice (short examples) MaaSGlobal

This appears to be the first fully functioning full specification MaaS provider. Its most advanced site is in the Helsinki region where it trades under the name Whim and currently (Feb 2016) is taking registrations for users but is not yet operating. It will give users packages of points for a fixed monthly fee and then users will be able to use these points for different trips. The approximate pricing structure is shown below, perhaps illustrating the challenges the MaaS business model.

The Whim App Why Whim? Sign Up **whim** Pricing News About Us FAQ 🌐

Limitless travel.

Monthly payment. No bounds.

| Pay Per Ride | Whim Basic | Whim Go | Whim Business |
|--|---|--|---|
| No monthly fee | Travel worth 94€ including: | Travel worth 179€ including: | Unlimited travel plan |
| Use Whim with no commitment and pay for trips as you go. | Taxis, car rentals up to 39€ Unlimited public transport in Helsinki, value 55€ | Taxis, car rentals up to 124€ Unlimited public transport in Helsinki, value 55€ | Unlimited taxis Unlimited public transport Select a car for any number of days, each month Ask us for an offer |
| | 89€ per month | 149€ per month | |

Whim wins the best mobile service award in 2017

Ubigo

This scheme operated as a field test trial in Gothenburg during 2014. Some 400 households initially expressed interest, which eventually resolved into 86 subscriptions (households) covering 195 people. These people were similar in many ways to the average Gothenburg resident except that they had somewhat lower car ownership and especially lower car use; in addition, many of them were “Innovators” or “Early Adopters”. Those who expressed interest but then did not take up the test were asked why not and, of those that responded, they “can be grouped into broader categories such as economy, a perceived mismatch between customer and service (e.g. between current travel patterns or lifestyle and what UbiGo offered), and a (perceived) lack of “alternative” transportation infrastructure” (Sochor, Strömberg and Karlsson, 2014:4). Essentially some people thought it was too expensive, some felt that their mobility needs were met perfectly well by their existing mobility options, and others thought that the options UbiGo offered were not good enough. MaaS will face these challenges everywhere.

Time frame

The technology to operate MaaS exists. The main barriers are organisational, getting many operators to share their data and pricing structures; and perhaps the biggest barrier is that no viable business model has to date been identified. It is not clear when this second barrier might be overcome; and the organisational barrier takes different lengths of time in different locations dependent on organisational cultures (for example, some public transport companies are more open than others) and the regulatory context.

Costs

There may be no direct costs to the public sector of MaaS. However, since it has not been as yet developed and delivered fully by the private sector, this indicates that it does not have a clear privately-financed business case. It is likely that those private sector organisations who perceive a benefit of having MaaS will therefore lobby for

public sector investment to make the private sector business case more favourable. It is unclear whether such investment would be at the national or local level.

Open questions

As MaaS is still very new, there are many open questions. These are summarised in the publication by Transport Systems Catapult (2016).

Possible future developments

MaaS is still very much in a prototype phase. Thus much of what has been described here already should really be described as “possible future developments”. Clearly, as self-driving vehicles develop the operators within MaaS will seek to use these to cut their own costs and thus pass a portion of the cost savings on to their customers.

How and where does it fit into a SUMP

MaaS could replace car ownership and indeed to attain critical mass and be successful it will have to do so. It could also improve the mobility of those people who risk social exclusion due to their low access to mobility. It could reduce vehicle miles travelled if it stimulates more carpooling, and also if it provides options for people not to travel but, as considered earlier, it could also increase VMT and congestion. Clearly though all these issues are closely linked to SUMP objectives and if MaaS is as big an innovation as its proponents suggest, it will have significant impacts on them.

To accommodate and to be prepared for the MaaS innovation, cities need to look into the laws and regulations regulating all these transportation modes and be prepared to modify and adapt them. Cities need to work out scenarios as to how MaaS could impact local and regional travel and how it could be controlled and channeled. This is of course difficult given that there are so few operating MaaS models around the world, so it is hard to be able to predict exactly what level of service it can provide, at what cost, and therefore how disruptive it will be.

Because MaaS is developing, there is still time for cities to facilitate discussions with potential MaaS providers and with transport operators in their area to:

- Develop a common understanding of MaaS and how it might operate in their area.
- Identify any threats or problems with MaaS and try to reach consensus on how to deal with these.
- Encourage stakeholders, especially conventional bus companies, to reflect on how MaaS might affect their business, and to develop a plan of how they will engage with it.
- Consider whether and under what conditions MaaS could help to achieve public policy objectives such as better mobility for socially excluded people, reduced congestion, and better value for money than conventional subsidised bus services.

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