

“MOBILITY AS A SERVICE” PLATFORMS

Carlos Oliveira Cruz¹ and Joaquim Miranda Sarmiento²

¹ Assistant Professor, CERIS/ICIST, Instituto Superior Técnico, Universidade de Lisboa, oliveira.cruz@tecnico.ulisboa

² Assistant Professor, CSG/ADVANCE, ISEG (Lisbon School of Economics & Management), Universidade de Lisboa, jsarmiento@iseg.ulisboa.pt

AGENDA

- Research Scope
- Concept of MaaS: a literature review
- Drivers of change
- MaaS solutions
- Case Study: Lisbon (Portugal)
- Conclusions

RESEARCH SCOPE

In this paper, we provide a conceptual framework of the existing drivers of change behind the adoption of MaaS solutions, and also the main barriers, together with the main advantages and disadvantages of these solutions. Additionally, we provide an overview of some of the operational solutions that are already in operation.

RESEARCH SCOPE

We found that two fundamental drivers are the main reason why MaaS is so useful for consumers.

Firstly, MaaS allows for a more flexible and tailor-made planning solution with an associated “mobility bill”;

and; secondly, it provides a “one stop shop” for all mobility services.

Introduction

Over the last years, urban mobility has experienced a profound change.

It is more complex and also typical home-work-home travel is no longer the rule

New mobility solutions are emerging (“sharing concept” and low carbon)

Introduction

Part of the response to the challenges posed by these new realities is the development of Mobility-as-a-Service (MaaS) solutions.

MaaS “aims to integrate various forms of urban transportation into a single mobility service accessible on demand, which is possible due to the digitalisation of urban mobility” (Moura, 2018).

Concept of MaaS: a literature review

Several definitions in literature (next table provides some examples).

The mobility ecosystem is becoming more fragmented, with the introduction of transport solutions, new business models, and new companies, - all of which are integrated with the same common objective, namely to provide affordable, convenient, and sustainable mobility solutions.

Author	MaaS definition
Hietanen (2014)	distribution model that deliver users' transport needs through a single interface of a service provider
Maas Alliance	MaaS is the integration of various forms of transport services into a single mobility service accessible on demand. To meet a customer's request, a MaaS operator facilitates a diverse menu of transport options, be they public transport, ride-, car- or bike-sharing, taxi or car rental/lease, or a combination thereof.
Hietanen (2014)	"Mobility as a Service (MaaS) is a mobility distribution model in which a customer's major transportation needs are met over one interface and are offered by a service provider. Typically, services are bundled into a package – similar to mobile phone price-plan packages."
Cox (2015)	A concept that allows households to purchase packages of mobility that provide an alternative to car ownership.
Finger, Bert and Kupfer (2015)	MaaS is in the first place a distribution model for transport services. MaaS to integrate transport modes through the internet
Giesecke et al., 2016;	MaaS is widely regarded as the next paradigm change in transportation. Service providers are expected to offer travelers easy, flexible, reliable, price-worthy and sustainable everyday travel, including, for example, public transport, car-sharing, car leasing and road use, as well as more efficient options for goods shipping and delivery.

Drivers of change

We have classified the drivers into three categories: technological, societal, and institutional.

Technological drivers can have a substantial impact, such as: electrification, autonomous vehicles, shared mobility, the internet of things, blockchain, and artificial intelligence.

Drivers of change

Societal drivers: sustainability and users' preferences will determine most of MaaS development in the future.

Institutional drivers, the main determinants of MaaS are data privacy, public versus private, and regulation.

MaaS solutions

Over the last few years a growing number of MaaS solutions have emerged, offering distinct services and options for users.

These solutions have been primarily concentrated in Europe and the US, although the latter has a lower level of development.

Name	Optymod	TransitApp	Whim	Mobility 2.0 Services	Ubigo
<i>City/Country</i>	Lyon / France	USA, UK, Canada, Europe and Australia	Helsinki Finland /	Palma Spain /	Gothenburg / Sweden
<i>Beginning of operation</i>	2012	2012	2016	2013	2016
<i>Main function</i>	Mobility Integrator	Mobility Integrator	Mobility Integrator	Mobility Integrator	Mobility Integrator
<i>Product</i>	Mobile App	Mobile App + Website	Mobile App	Mobile App + Website	Mobile App
<i>Service</i>	Transport planner, and booking for bike sharing, regional trains and parking	Pay-per-ride for public transport, bike and car sharing, taxi	Pay-per-ride for taxi drivers, car rental, bike sharing and public transport Mobility planner	Pay-per-ride for public transport, bike-sharing and taxi	Pay-per-ride for taxi drivers, car rental, bike sharing and public transport Mobility planner

MaaS solutions

MaaS is not a binary concept and accordingly the reality has many variances and different layers for the adoption of these solution.

Table 3 presents the existing levels of MaaS. Nowadays, the most common levels found in cities are levels 0, 1 and 2, with Levels 5 and 6 still being part of the future medium to long term vision of most cities.



Level	Description	Explanation
0	Base level, corresponds to existing status quo in most cities	There are account base systems, in place, individual models of transportation already have a digitized interface and the traveller has information available online for each
1	There is one-to-one integration between some private services	Duets of services start to develop joint offering (e.g. tolling+car park, private car+ferry, and car +ride bus (services))
2	Integrate payment and ticketing across modes of limited public and private modes of transportation services	On this level, greater integration occurs but this time between a private operator and a public transport mode of operation. Integration shows promise but other PT modes sceptical and continue to stay aloof.
3	Unified interface single account used in multiple modes of transport services.	Instead of having multiple channels, interface is unified across modes, providers and services that the traveller finds necessary for journeys are provided by a single meta-operator through a Taveler account.



Level	Description	Explanation
4	All modes are integrated, private and public, including routing, ticketing and payment.	Open data and standards are defined and commonly used by all transportation providers and MaaS meta-operators to provide services for Travelers.
5	Active artificial intelligent choices are taken based on travels preferences and near real time data for ad-hoc changes to a journey.	Based on traveller specific behavior and profiling, minimal (to none) intervention is needed by the traveller for an end-to-end journey based on the traveller's preferences, past travel history, and filters.
6	MaaS connects beyond mobility, interfacing with IoT's, smart building, and smart cities.	As MaaS evolves, so do other systems involved in the traveler's day, su as smart work spaces, smart homes, smart cities, and general services (e.g. food, groceries, entertainment, sport, culture) to provide convenient and seamless interface with the Traveler's eco-system.

Case Study: Lisbon (Portugal)

This section provides a diagnosis and analysis of the use of MaaS-type apps in Lisbon, the capital of Portugal.

The city of Lisbon has a population of 550,000 habitants, with 2.8 million residing in the Metropolitan Area.

Case Study: Lisbon (Portugal)

As in most cities, inner mobility is provided by the metro and light rail systems, while the commuter transport is ensured by several commuter rails and ferries, articulated with several bus operators (public and private).

Over the last five years, the system has evolved significantly, given the emergence of several new transport operators, both the ride hailing service, and bicycle, scooters, and car sharing.

Case Study: Lisbon (Portugal)

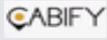
The organic growth of mobility solutions and the absence of a dominant MaaS operator that would could naturally integrate all new services, has led to the emergence of several MaaS options.

Transport operators are not waiting, and are developing their own apps. It is clear that in the medium and long term, mobility apps and MaaS solutions will merge into truly integrated services.

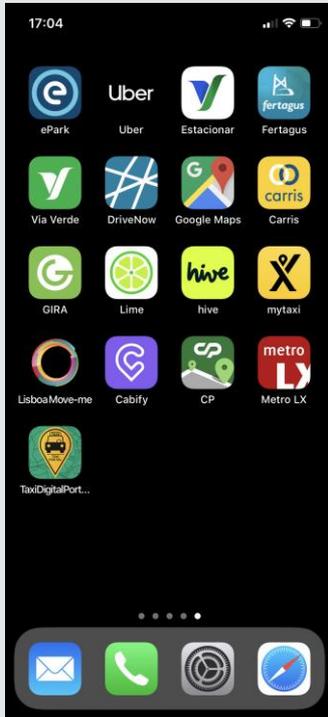
Case Study: Lisbon (Portugal)

On the private sector side, the most relevant initiative has been that of Via Verde, which was traditionally a digital payment system for tolls in motorways, but has been growing into other services, such as public transport (integrating a privately-operated commuter rail), parking, car-sharing, and even developed a consumer reward program.

Case Study: Lisbon (Portugal)

	Transport mode	Operator	Mode for payment and utilization	App / system used
Traditional transport services	Ferries		Digital payment & physical ticket	
	Bus		Digital payment & physical ticket	
	Light rail		Digital payment & physical ticket	
	Rail	  	Digital payment & physical ticket (CP) Fully digital (Fertagus)	 
	Metro		Digital payment & physical ticket	
	Taxi		Fully digital	
	Parking	 	Fully digital	 
New transport services	Car-sharing	  	Fully digital	 
	Ride hailing	  	Fully digital	  
	Bike sharing		Fully digital	
	Electric scooters	   	Fully digital	   

Case Study: Lisbon (Portugal)



Regarding the nature and the number of MaaS operators, it is not clear whether the dominant MaaS operator will be one of the large data aggregators (e.g., Google or Apple), or one of the smaller mobility integrators that are emerging in each city.

CONCLUSIONS

The existing status quo is still a competitive strategy, rather than a cooperative of MaaS operators, and it is still unclear who will be the winners.

It is also unlikely that any of the existing operators will be a dominant operator under their existing business models.

CONCLUSIONS

Some form of partnerships between global data aggregators and mobility integrators will be required in order to provide truly integrated MaaS.

In Europe, the process has been managed by central governments, which tend to look to the potential of MaaS for contributing to reducing car trips and to enhancing public transport.

CONCLUSIONS

MaaS will also require new mobility behaviours from users.

There are specific reasons for why people resist changes to their mobility behaviours.

This is simultaneously a barrier towards the adoption of MaaS, and is also one of the main reasons why MaaS solutions are so needed.

THANK YOU!

Carlos Oliveira Cruz^{1*}, Joaquim Miranda Sarmiento²

^{1*} Assistant Professor, CERIS/ICIST, Instituto Superior Técnico, Universidade de Lisboa, oliveira.cruz@tecnico.ulisboa

² Corresponding and presenting author, Assistant Professor, ADVANCE/CSG, ISEG (Lisbon School of Economics & Management), Universidade de Lisboa, jsarmiento@iseg.ulisboa.pt *I gratefully acknowledge the financial support received from FCT- Fundação para a Ciência e Tecnologia (Portugal), and the national funding obtained through a research grant (UID/SOC/04521/2013).*