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The Journey to MaaS

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Abstract

Through a pilot project of a real solution for Mobility as a Service (MaaS), municipalities in Business Region Aarhus want to investigate the possibility for creating a more efficient mobility system by integrating public and private mobility services. This calls for a setup that includes both mobility providers, data platform owners, service providers and the travellers.

The project demonstrates a new way of organising the mobility system in the region. The demonstration project will combine public transport solutions with private peer-to-peer ridesharing in an integrated solution in a real-life environment. The mobility solution will be based on the principles of MaaS. The main goal of the project is to demonstrate a new way of organising mobility on the foundation of a sound and sustainable business case.

Background

The transport demand in Aarhus is increasing as the city is growing. During the last ten years, the number of inhabitants has increased by 11 % and the number of cars has increased by 27 %[1].

In the Municipal Development Strategy (2016), smart growth has high priority. The city is growing denser in the future, moving travel destinations closer to each other and making the public transport system more efficient. By following this strategy, the demand for transport should decrease. Furthermore, the smart choice of mobility is an important part of the development strategy, supported by infrastructure projects, such as the almost completed light rail and super commuter bike paths.

But mobility services should not only count on infrastructure and services provided by the public sector. Peer-to-peer ridesharing is an undeveloped concept for daily commuting and could potentially play an important role in a coherent mobility system, especially in areas challenged by few options for public transport.

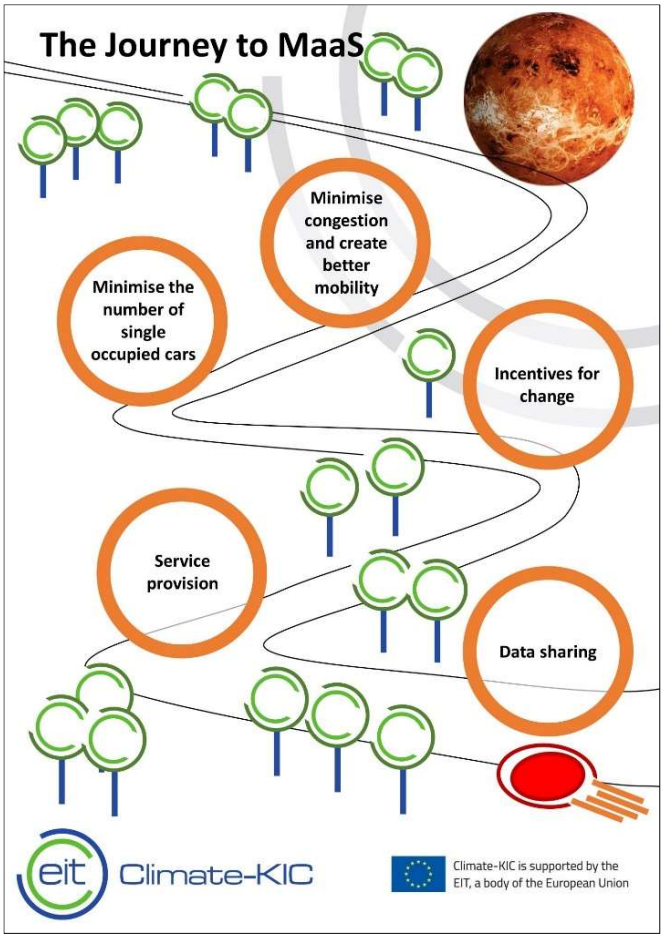


Figure 1: The Journey to MaaS narrative. The Demonstration project in Business Region Aarhus is supported by EIT Climate KIC

Cities are important actors and good places to test advanced transport technologies like MaaS because they can work with political tools (incentives and frameworks) to change citizens' mobility behaviour. As cities, we define the framework for incorporating MaaS solutions together with the development of the city. Aarhus and its surrounding municipalities have an interesting, mixed context of dense urban areas and rural areas. It is an obvious setting to make a pilot project that demonstrates elements of a MaaS system, focusing on ridesharing because it both contains the challenges of mobility found in cities and in the rural areas where the car still plays an important role in the mobility system.

As we can see from figure 2, the average number of people in the cars has been decreasing since the first count by the Danish Road Directorate in 1981. At that time, the average number was well above 1.8, whereas the number in recent days are around 1.40 in average. Transport related to commuting constitute the lowest average number of people in the cars with only 1.05[2]. So, for each 100 passenger cars on the roads during peak hours, only five people besides the driver of the car will be transported. At the same time, up to 400 free passenger seats will be available.

Similar challenges are faced in the realm of public transport. Public transport planning and management seeks to limit the number of free seats in the buses, i.e. through a big restructuring of the public transport network in Aarhus in 2011 and by the implementation of the light rail system in 2017. Avoiding free seats

[1] Numbers from Statistics Denmark: https://www.dst.dk/en

[2] https://www.modelcenter.transport.dtu.dk/-/media/Centre/Modelcenter/modeller-og-publikationer/Faktaark/2014-Faktaark_personer_per_koeretoej.ashx?la=da&hash=BF3E918DABBEBE2EFD4D914C6B6294D093EFC45B

lowers the public payment per passenger. However, an emerging challenge for the efficiency of public transport is congestion. The longer the buses must operate on the roads to provide the same (or even reduced) service for the user, the more expensive it gets to operate. Getting more people to use ridesharing in congested areas will there for also make the public transport system more efficient. However, there might be a risk of also pushing towards a system that makes Public transport less competitive and therefore the number of free seats might increase. Therefore, continuous planning and adjustments should carry on for the public transport system.

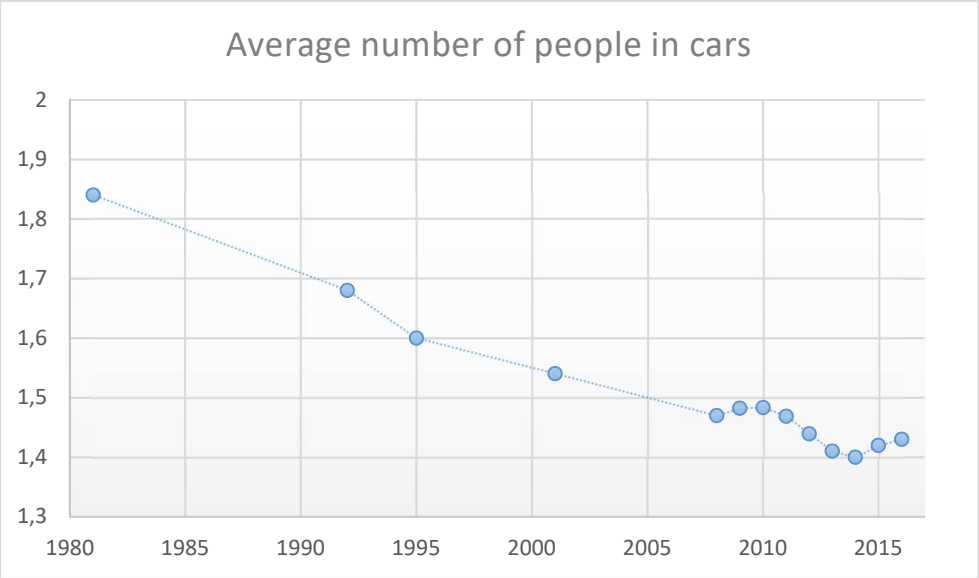


Figure 2: The development in the average number of people in person cars in Denmark. Source: Danish Road Directorate.[3] [4]

Ridesharing is an important mode of transport within MaaS, as the car still will continue to be part of an efficient and flexible mobility system. It means that the climate challenges about congestion and CO2 emissions still will apply. Ridesharing is also seen as one of the major challenges in a MaaS system because it is a mode of transport that requires a change in the users' mobility behaviour. Behavioural change and the willingness to buy-in on a service from the user perspective, will be a very important component of the project, and incentives will be tested to get travellers on board.

What are we talking about?

Let us continue by a short clarification of the different terms used in the jungle of shared mobility. On the European stage, many different terms for the same mobility services have been used, primarily in different countries. In the UK, traditionally a Car Club is what other countries refer to as car sharing, where as in France, car sharing can be used for what others are referring to as carpooling. Carpooling is also referred to as ride sharing and can be confused with ride hailing and other on demand mobility options.

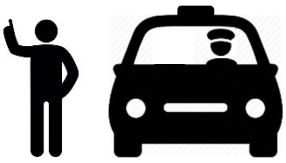
It is however very important to keep very clear in these definitions, and in the Business Region Aarhus setup, the focus for the MaaS system will be to combine public transport provision (i.e. buses and light rail) with peer-to-peer ride sharing (carpooling). The term ridesharing is used to keep in consistent with the term car sharing. With car sharing, you share a car, either provided by a car sharing company or by a peer. The key of the concept is that you have the car at your disposal and can use for what you want when you have booked it. If you are a member of a car sharing club or scheme, you don't need to own a car, but you can use a car when you need it. This however, does not necessarily solve the challenges that the region is facing.

[3] http://www.vejdirektoratet.dk/DA/viden_og_data/statistik/trafikken%20i%20tal/Noegletal_om_vejtransport/Sider/default.aspx
[4] Numbers from 1908 to 2008 based on counts, numbers from 2009 and onwards based on national travel survey.

Better occupancy of each car, however, will potentially have a greater impact on the mobility system. Ridesharing, where you share a specific ride with a peer will increase occupancy of the cars and make the system more efficient. With peer-to-peer (P2P) ridesharing, you as a driver or a passenger share the ride – the specific journey – with your peer and will be in the vehicle along with your peer on the whole journey or a part of it.

It is highly important to distinguish P2P ridesharing from ride hailing. It is often diverting the discussion on P2P ridesharing that the line between P2P ridesharing and ride hailing by some are considered very thin. Hence, Uber – considered being ride hailing – will tend to be mentioned in discussion about ridesharing, with all its societal challenges. These challenges cannot be applied to P2P ride sharing in the same way since P2P ridesharing in its purest form is not about making profit, but offsetting costs of fuels and maintenance.

Table 1: Concepts of shared mobility

Ridesharing	Carsharing	Ride Hailing
		

Taking MaaS to the next level

The key objective is an efficient mobility system that supports both economic, social and environmental sustainability objectives. It contains both the demand side of mobility and the supply side. An efficient mobility system provides either better mobility for the same price or less, for both society and the traveller. It makes it easier to use all modes of transport in a flexible and easy way - as an attractive alternative to single occupancy cars. The efficient mobility system is complex. It works with many stakeholders – both private and public and is set to replace a well-established and functioning set of mobility services. The MaaS project in Business Region Aarhus will in 2018 and 2019 take us closer to this, by thoroughly analysing each component in the realm of MaaS as lever for both the supply and demand side of the mobility system.

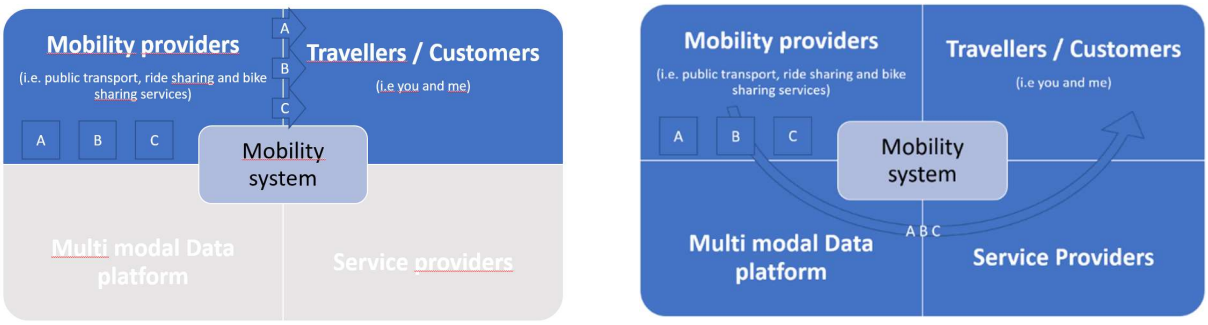


Figure 3: Definition of a MaaS-system in Denmark

The figures above show very simplified how the mobility system works today (on the left) and what system that the demonstration project in Business Region Aarhus is demonstrating (on the right). As seen on the figure to the left, mobility providers are providing mobility (A, B, C…) such as public transport or ride sharing directly to the traveller, but with no coordination between this, hence the traveller has no opportunity to plan a multi modal journey combining public and private modes, nor can the traveller pay them together. However, it is worth mentioning that all public transport in Denmark already has:

- a multimodal planning opportunity (Rejseplanen)

- and payment method (Rejsekortet)

The demonstrated system is visualised in figure 3 above to the right. In other words, the project will demonstrate how mobility can be provided to the travellers as an integrated service – MaaS. How the demonstration will be carried out will be described in more detail in the section below, but the main idea of the demonstration is to bring the various stakeholders together, from the mobility providers in the system, through the data platform and service provider and all the way to the traveller.

Mobility providers are the operators of public transport, ride sharing services, taxi companies, car sharing service – explained in more detail in appendix 1. Today we see coordination between different public transport modes, but not – in a systematic way – between public and private mobility providers.

For this specific pilot project, mobility providers will be public transport in Business Region Aarhus that in Denmark already has both an integrated planning platform and integrated ticketing. All public transport could be represented by the letter "A" in figure 3 above. The pilot project will demonstrate mobility option "B" as well in form of a privately developed ridesharing solution. The peer-to-peer ride sharing solution for easy commuting will be developed to use in the project.

As shown in figure 4 below, there is a strong collaboration on the public transport side, hence are both Rejseplanen and Rejsekortet owned by the national train operator (DSM) and the public transport authorities. There is a common understanding that the provided mobility is mainly public transport, the travel planner is Rejseplanen and the payment method (although amongst local solutions) is Rejsekortet. At the end of the day, the mission is to bring more people to public transport.

On the other hand, you will have private mobility provider such as GoMore in Denmark and Zify in India and France, providing a system for peer-to-peer ride sharing. Both offers, and bookings are made via a dedicated app and they have separate payment systems. The perspectives from the companies are business oriented.

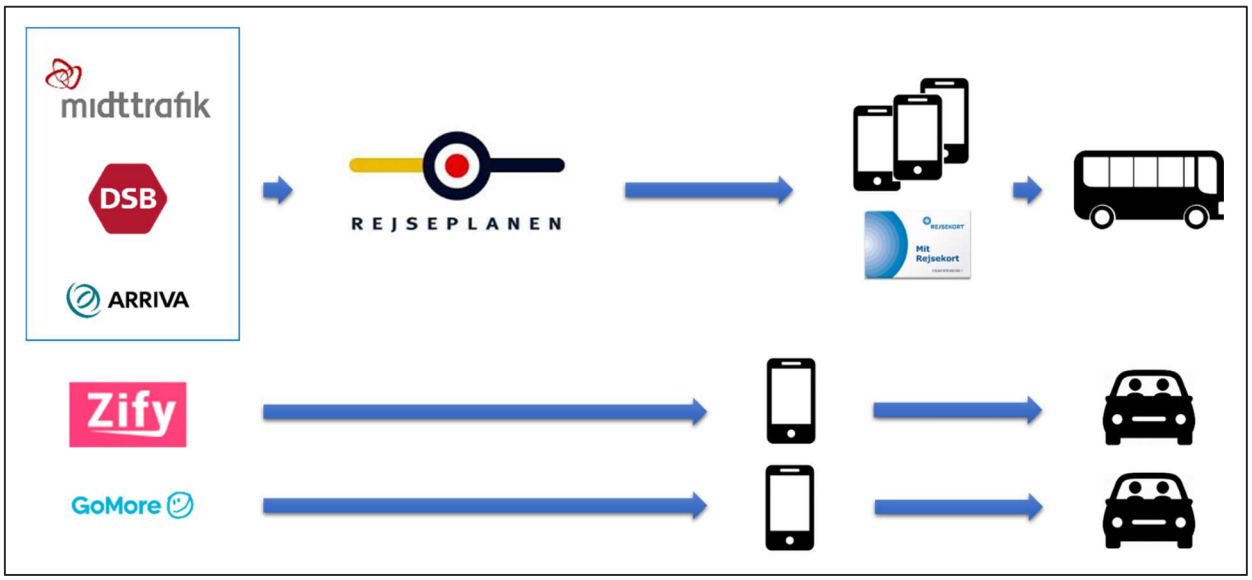


Figure 4: The mobility system at present

A dedicated data sharing platform will gather all relevant mobility data from the mobility providers as described above. The platform will ensure that data is easy accessible for other services, that data can be processed in the same way and thereby be comparable.

To acquire the data sharing platform, a Public-Private Innovation Partnership (PPI) is established. The PPI facilitates innovation between public and private actors, in this case between a data sharing platform the local authorities in Aarhus. The platform will be set up and operated the Austrian company Fluidtime, whilst the public partner (The City of Aarhus) will define requirements.

In June 2018, an agreement between Business Region Aarhus and the Danish Federation of Motorists (FDM) was established. FDM will in the demonstration project serve as the service provider of the system. This meaning that FDM will present the integrated data from the FluidHub (Fluidtime's data management platform). The Danish Federation of Motorists is in this particular case a very interesting partner, since they are already in close contact with the segment of people, that would be interesting to influence; namely the car drivers.

To be able to implement a successful MaaS system in Business Region Aarhus that both take into consideration

1) the objectives of reducing congestion and thereby improving the mobility system in cities,
2) providing better and more efficient mobility in areas that are scarcely populated and where public transport therefore easily gets ineffective,

the car drivers are the key target group. The question to answer for a successful implementation will therefore be how to get drivers to open their journeys to passengers. Further, how to get current car drivers to become passengers in other car drivers' cars.

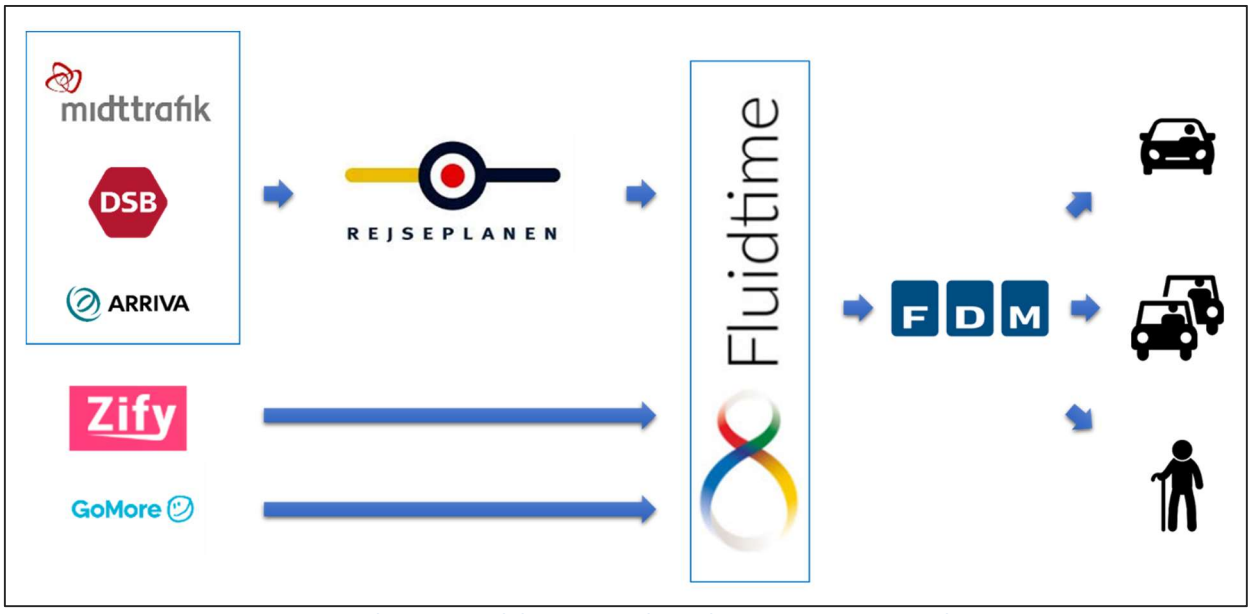


Figure 1: The MaaS-mobility system planned in Business Region Aarhus

How the value stream of the system will be, is still not clear and will be tested throughout the demonstration. Many working questions will be relevant to address to the demonstration of MaaS, such as:

- What is the buy-in for the **public sector**?
  - Does the public sector meet societal, environmental and economic challenges through the MaaS-solution (congestion, climate impact, an efficient (public) transport system, etc.)?
- What is the buy-in for the **private mobility provider(s)**?
- What is the buy-in for the **data platform provider**?

- What is the buy-in for the **service provider**?

- What is the buy-in for the traveller?
    - Will the traveller get better mobility options and/or cheaper journeys?

All stakeholders are crucial in setting up a sustainable Mobility as a Service solution. If the solution is not solving any societal challenges, there will be no need for the public sector to engage in it. If there are no economic benefits for the private actors, then there is no need for them to engage in the solution.

Appendix 1: About Business Region Aarhus

Business Region Aarhus is a political partnership based on a shared interest in the continued growth and development of East Jutland. In addition to the close political cooperation of our 12 member municipalities, we forge partnerships with knowledge institutions, the business community and local organisations.

One example is our strategic cooperation based on our positions of strengths in particular fields of activity. This has involved cooperation across municipalities and disciplines, and with new partners. Most recently, with the help of knowledge institutions, businesses and decision-makers, we have expounded and realised projects within the fields of production and knowledge, ICT and smart communities, and in the region's food cluster.

Business Region Aarhus looks after the interests of East Jutland when it comes to framework conditions and competitiveness, ensuring that the East Jutland metropolis maintains a strong and visible profile, both nationally and internationally. We are committed to growth and development, and Business Region Aarhus speaks with one, powerful voice that provides us with a stronger platform in a competitive, global world.

Our cooperation comprises the following municipalities: Favrskov, Hedensted, Horsens, Norddjurs, Odder, Randers, Samsø, Silkeborg, Skanderborg, Syddjurs, Viborg, and Aarhus.

Business Region Aarhus is a leader in Smart City solutions – in order both to ensure the best possible framework for our citizens and businesses, and to offer an attractive test environment for technological development with an international perspective.

In Business Region Aarhus, technology supports business growth and attracts newcomers to urban and rural areas. Basically, smart communities are cities, towns and rural areas where the available resources are better utilised. Where new resources are activated, and the existing ones are used more appropriately. Communities where digital technology helps to challenge the classic division of labour between public and private sectors.

Extract from ***Businessregionaarhus.com***