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CIVITAS INSIGHT

Mobility-as-a-Service: A new transport model

Hyper urbanisation, climate change, and demographic and societal changes are some of the megatrends that have imposed pressures on transport networks and set obstacles to door-to-door mobility. By virtue of technological breakthroughs many of the obstacles could be hindered and seamless mobility could be achieved. Novel mobility services that heavily rely on technological advances could contribute to seamless mobility.

A chance for a fundamental change in people’s behaviour in and beyond cities

Urban transport plays a fundamental role in meeting the objectives of economic competitiveness, social cohesion and sustainable growth. As such, an efficient transportation system has to be the heart of every successful city. However, the majority of today’s transport networks are the by-products of earlier systems that were designed to serve societies with rather different characteristics. Since then, certain key drivers have been restructuring the way we live and think, as well as the technologies we use in our everyday life. This changed society strives for efficiency and connectedness, which need to be core features in modern transport ecosystems. Understanding the drives, the pressures they place, and the changes they necessitate in urban transport networks are the first steps in creating transport systems suitable for today’s society.[[1]](#footnote-1)

‘The millennials don’t value cars and car ownership, they value technology — they care about what kinds of devices you own’, said Mimi Scheller, a sociology professor at Drexel University and director of Mobilities Research and Policy Centre, in a New York Times article, already in 2013.[[2]](#footnote-2) ‘The percentage of young drivers is inversely related to the availability of the Internet. Why spend an hour driving to work when you could take the bus or train and be online?’ People’s lifestyles have become more complex in the past fifty years. People are more likely to buy mobility than a car, and thus are trending towards a service model of mobility. With the rise of technology in a world that is increasingly becoming more integrated a long-term cultural shift in what consumers want and expect from transportation could mean an alternative future for both older and future generations. A new ‘less-driving lifestyle’ is emerging amongst the millennial generation, a generation that is exchanging driving for cycling and walking and that is more enthused about the latest technological product than owning their first car. And with an ageing population will come an older group who have more incidence of long term health conditions which will mean a greater incidence of having to give up the car. Indeed, free travel concession is making many older people think twice about car ownership, or at least giving up that second car.[[3]](#footnote-3)

What if a concept exists that can improve ridership habits and transit network efficiency? A service, which is able to decrease costs to the user, improve utilisation of transport providers and reduce city congestion? Mobility-as-a-Service (MaaS) is such a concept that combines transportation services from public and private transportation providers through a unified gateway that creates and manages the trip, which users can pay for with a single account.

As defined by the European Mobility-as-a-Service Alliance[[4]](#footnote-4), the key concept behind MaaS is to ‘put the users, both travelers and goods, at the core of transport services, offering them tailor made mobility solutions based on their individual needs. This means that, for the first time, easy access to the most appropriate transport mode or service will be included in a bundle of flexible travel service options for end users’.

MaaS is not limited to individual mobility as the approach can be applied to movement of goods as well, particularly in urban areas. This shift is fueled by a myriad of innovative new mobility services such as bike-sharing[[5]](#footnote-5), carpooling[[6]](#footnote-6) or car sharing[[7]](#footnote-7). This shift is further enabled by improvements in the integration of multiple modes of transport into seamless trip chains[[8]](#footnote-8), [[9]](#footnote-9), with bookings and payments managed collectively for all legs of the trip.

The benefits of Mobility-as-a-Service are manifold, for both, the users, the public sector and the businesses as well.

* Benefits for the user: Developed, personalised and smart mobility services reflecting the users’ diverse needs. Seamless, well-functioning transport services and easy access to mobility are the main benefits for users, as well as strong user orientation, high service quality and competitive pricing.
* Benefits for the public sector: A full deployment of ICT (Information and Communication Technology) improves the effectiveness of the whole transport system. An efficient allocation of resources (based on real needs of end-users), a growth in employment and vitality generated by new businesses, and improved traffic incident management, as well as a more reliable transport system through advanced data deployment can be seen as the main benefits for this group.
* Benefits for businesses: MaaS is definitely a profitable market for new transport services. Renewed opportunities for the traditional transport and infrastructure business sectors are part of innovative service concepts and co-operation.

CIVITAS stimulates door-to-door mobility services

Innovative transport telematics systems for traffic management and traveller support can make urban passenger transport faster, more reliable and more efficient and as such more passenger friendly. The CIVITAS Initiative’s Thematic Group on Transport Telematics[[10]](#footnote-10) provides a number of resources, such as training and guidance material, policy recommendations, and learning opportunities such as trainings, study tours or workshops. The group also offers the possibility to network with the city officials and experts involved in examples of best practice.

Although ITS and its corresponding features are one of the CIVITAS Initiative’s building blocks, the concept of Mobility-as-a-Service is relatively new and therefore only since the last few years also the CIVITAS Initiative takes this new concept into consideration. The following CIVITAS case studies aim at providing an overview on how this topic evolved since 2002, from real-time information to IT-based traffic management, further to smartphone applications, mobility 2.0 services and a mobility alliance.

CIVITAS I | Rome (Italy): Real-time multimodal information for smart phones

As a way of further promoting a modal shift among citizens and tourists towards public transportation, Rome’s Mobility Agency (RSM) explored ways to improve access to mobility information via new media and mobile devices.

By providing an online, wireless, multimodal, multilingual information system, RSM facilitated a multilingual interface for mobile devices for personalised journey planning to reach users on the move with information about the most appropriate public transport services. This service provides information about bus arrival times for each bus line at each bus stop, using data generated by automatic vehicle monitoring, and real-time news on traffic, road works, demonstrations, disruptions and access restrictions. Furthermore, the journey planner provided information about the best routes calculated for public transportation, with an interactive map. Additionally, it also included information on the availability of shared bikes, on the availability of parking spaces in four city car parks, and information and advice on services and relevant contact details.

The number of visitors to website rose by 197 percent between 2002 and 2005. Following the introduction of the wireless system, 10,000 queries per month were performed by mobile users. The success of the measure was based on the efforts made to design a platform capable of delivering information (texts and maps) according to the graphic functionalities of each device, ensuring the most user friendly information for users.[[11]](#footnote-11)

CIVITAS II | Stuttgart (Germany): Introducing IT-based event-oriented traffic management

The measure focused on improving traffic conditions and promoting intermodality in the context of major events in the city and reducing congestion and travel times by providing optimum information. Prior to measure implementation, Stuttgart's heavily burdened road network suffered traffic disruptions about 90 days per year due to coinciding events in congress centres, concert venues and sports stadiums. The Integrated Traffic Management Centre was therefore established in 2006 to ensure better control of traffic and traffic information in Stuttgart.

Research was carried out in order to help establish the strategic and technical bases for traffic control operations, including scenarios for incident management and for the parking and traffic guidance system. The inauguration of the new Security and Mobility Management Centre, which includes the Integrated Traffic Management Centre, represented a unique approach in Germany. It combines diverse urban authorities such as city traffic management, the headquarters of the police traffic department, the fire department and ambulance service, and the Stuttgart public transport operator under one roof. The partners cooperate at a strategic and operational level, coordinating information and taking concerted action allowing for rapid and direct crisis management. The Internet information platform, launched in August 2008, provides road users with up-to-date information on traffic conditions and parking space availability in Stuttgart. Additionally, the Integrated Traffic Management Centre enables control over traffic flow across all transport modes during foreseen events (commuter traffic, construction, sports matches) and unforeseen circumstances (accidents). Due to the new Integrated Traffic Management Centre, traffic management during the Football World Cup 2006 was smooth and traffic jams were prevented. Traffic is now able to leave the car park after a football match rapidly due to the use of three lanes rather than two. The fourth lane for incoming traffic is reserved exclusively for pedestrians leaving the area. This has halved the time needed to empty the stadium car parks. Prior to the measure, it had taken around two hours to empty the large car park of the 3,500 vehicles.

A comparison of emissions values during peak period revealed a reduction of between 10.2 and 53 percent during six 10-minute periods, equating to an hourly average reduction of approximately 38.1 percent of carbon monoxide and nitrogen oxides from traffic leaving the stadium after a match.[[12]](#footnote-12)

CIVITAS PLUS | Brescia (Italy): Mobility channel

The city of Brescia worked on building a new light automatic metro line. Prior to this development, the city had never encouraged significant use of intermodal services in the past. Recently, several initiatives were proposed to promote an intermodal transport system. One of them is the smart phone application called Brescia Mobile Channel (BMC).

The measure aimed to promote a smart image of public transport in the city. It involved developing different applications compatible with key smart phone operating systems, accessible from mobile devices and able to exploit a device's computing, storage and communication capabilities, both online and offline. Information is updated in real time, including the number of available parking places, available bicycles for the bike sharing service and bus timetables. Considering that the application was developed for both the Apple and Android operating systems, a larger amount of potential users was reached. In September 2012, the total number of downloads of the Apple version of the application (which was released in November 2011) was more than 3,350, while the number of downloads of the Android one (released in July 2012) was more than 650.

From the user view point the acceptance level is quite high, since interviewed people gave a mark of four out of five, expressing their appreciation for the service. This good result is mainly related to the progressive upgrades done to improve the quality of the product. BMC users had also the possibility to leave a comment after closing the application. Analysing the feedback together with back-office information revealed that the availability of information updated in real time on bike sharing and parking was highly appreciated. Thanks to such dynamic information the time connection of BMC sessions substantially increased. In the near future, the BMC application will be upgraded with further features, such as information about the new metro line and an updated map layer with the new bike sharing stations near the new metro stations.[[13]](#footnote-13)

CIVITAS PLUS II | Palma (Spain): Mobility 2.0 services

For the City of Palma, the main challenge is to combine available mobility information and on-going ICT development processes from different departments and operators into an integrated mobility platform. The aim of the platform is to offer users the possibility to plan intermodal trips in real time and choose the most appropriate transport mode for them. The information should make the use of public transport services, walking and cycling easier and more comfortable and, thus, discourage the unnecessary use of private vehicles. A beta version of the platform – an integrated Mobility App, was launched in 2013.

The wide interest of users in real time mobility apps was discovered in spring 2013, when the first App for real time bus departure information covering the network of Palma Municipal Public Transport Company (EMT) was launched. By May 2014, more than 50,000 downloads have been registered just on the Android platform. While enjoying the massive acceptance of this App, different parties in the city started to work on other services as well. A private developer included data from the Palma public bike sharing system in a generic App on public bikes. The operator handling the on-street paid parking introduced an App for mobile phone payments in April 2014. However, to achieve the desired intermodality, a more coordinated approach is required to integrate the different isolated projects and to overcome technical and administrative barriers. Therefore, Palma decided to build the integrated Mobility App - one of the measures implemented within the CIVITAS DYN@MO. The main technical challenge is to reach a proper concentration of all the scattered data to feed the main core of the App.

On the administrative side, the different departments and public companies have to agree on cooperation. In the first phase of the project, the Palma Smart Office supported with the standardisation of data formats and offered open data platforms for private developers. After this first phase, local partners came to a conclusion that it was necessary to contract an external company that can take care of the overall integration and design of the user-interface of the Mobility App. With the Mobility App, Palma hopes to offer its citizens an easy way to plan their trips and receive mobility information.[[14]](#footnote-14)

CIVITAS PLUS II | Aachen (Germany): Mobility Alliance

The Mobility Alliance in Aachen tackles the main challenges of urban mobility, for example, reducing environmental pollution (local and global pollutants) and noise emissions, improving road safety, revitalising urban space, discouraging the use of private vehicles, and encouraging smart information and communication services for improving alternative mobility services and harmonising them. Mobility Alliance brings together different players of the mobility market in a regional mobility network, concentrating know-how and opening up synergies in the field. The Mobility Alliance represents a uniform information and distribution platform that enables citizens to arrange their individual mobility needs in a fast, comfortable and competitive way.

The main goal of the Mobility Alliance in Aachen was, that all local mobility providers are aiming to work together in order to develop a (cross-border) mobility platform for the regional transport market and to offer multimodal/intermodal mobility options for citizens, built on interactive Mobility 2.0 applications. The aim was to provide a multimodal/intermodal routing information platform, as well as integrated reservation and booking options for car-sharing and bike-sharing services with an interoperable (cross-border) ticketing function that extends to The Netherlands and Belgium.

All mobility service providers in the Aachen region have (various) electronic information and distribution channels as well as diverse access media (paper tickets from ticket machines or printed at home, validation of mobile tickets via smart phones, chip cards, etc.). In addition, a lack of coordination can be observed, as information and distribution systems run largely independently from each other. The city and county of Aachen aim to cooperate more closely on mobility services. This has led to the establishments of networks to increase communication and to initiate common activities. In particular, activities such as ‘FahrRad in Aachen’ (biking in Aachen), the ‘European Mobility Week’ or ‘pedelec-testing weeks’ have been designed to encourage alternative mobility solutions. The goal of establishing a Mobility Alliance is highly supported by the local authorities. A tangible output was an expert report, that provides an overview of multimodal mobility offers in Germany and particularly in Aachen. Second, a detailed market analysis, including information on mobility behaviour in the Aachen region. Third, a determination of customer target groups, considering the specific requirements of future mobility. The expert report also includes a detailed concept for a Mobility Alliance, examining various organisational, financial, technical and legal issues. Moreover, this concept provides proposals for the implementation of a Mobility Alliance in the Aachen region. This has led to the development of a business model, including a short-term, practicable solution for the pilot phase and long-term concept that goes beyond the CIVITAS DYN@MO-pilot.[[15]](#footnote-15)

Creating a seamless, demand-based travel experience

Full implementation of Intelligent Transport Systems (ITS) will allow advanced capabilities across national boundaries and transport modes, to respond to multiple users’ needs and enable improved travel performance. Analysis and development of coherent concepts, encompassing all relevant elements, systems and services to bring Europe's transport system towards a more user-centric, digital and intelligent mobility model to make advanced travel planning a reality need to be ensured. A paradigm change in transportation is expected to take place through Mobility-as-a-Service, where the service providers could offer travellers easy, flexible, reliable, price-worthy and environmentally sustainable everyday travel, including for example public transport, car-sharing, car leasing and road use, as well as more efficient goods shipping and delivery possibilities. Although activities in this field are on-going in some of the EU Member States, at present, there is no quantifiable evidence on its costs and benefits, as well as on its influence on travel patterns and behaviour of the end users.

Apart from the CIVITAS examples mentioned above, there are already some further examples about Mobility-as-a-Service in European cities. Most prominently are the examples from Finland, where this idea was born, Vienna (Austria) with its SMILE project-pilot, and Hannover (Germany), where the world’s first example of Mobility-as-a-Service has been launched.

* The MaaS concept was born in Finland where it already plays a key role in the national transport policy. Originally, MaaS was one of the concepts to improve the traffic flow, safety and environmental performance in transportation developed by ITS Finland, a consortium of experts developing information and communications technology solutions. It is widely recognised as a disruptive innovation, which will change the entire transportation universe through digitalization and combining the best of existing apps. With transportation being the world’s second largest consumer market and the average user spending EUR 300 per month on their mobility needs, MaaS has amazing potential. Besides bettering consumers’ lives and protecting the environment, it will offer unparalleled business opportunities across the globe. MaaS Finland, the world’s first Mobility-as-a-Service company, commenced operations on first February 2016 raising a total of EUR 2.2 million in its first call for funding from private investors and the Finnish Funding Agency for Technology and Innovation Tekes. Since its announcement, the MaaS concept has attracted a great deal of international attention. Now, MaaS Finland has commenced operations as an independent company focusing on the international market. MaaS Finland intends to serve as an operator between transport services providers, users and third parties. It will combine all the existing transport services into a single mobile application on the ‘single-ticket principle’ and offer personalised transport plans tailored to customer needs.[[16]](#footnote-16)
* The project SMILE, Smart Mobility Info & Ticketing System Leading the Way for Effective E-Mobility Services, in Vienna was pilot user tested for 6 months. A unique mobility service for customers, it allowed access to a single platform, door-to-door mobility alternative to the private car by integrating a broad range of mobility services with public transport, with the possibility to immediately book and pay for these services. It created a whole new customer experience, relying upon integrated real time information, booking and ticketing. Furthemore, it provided the possibility of comparing and choosing the best route through an app, which was a new experience for customers in this segment. The technology and methods used in the project lead to improvements in the communication with the customer, providing the best route for the customer and gives an incentive to public transport through the breakdown of barriers of entry. The SMILE platform gathered all relevant and available data for real-time information, booking, ticketing and payment through standardised interfaces to the different mobility providers. The mobile application based on the SMILE mobility platform enabled the customer to make the best choice for their everyday mobility. It is a a breakthrough in terms of usability and as an enabler for integrated multimodal mobility services. The integration of multiple mobility providers throughout Austria such as ÖBB (Austrian Railways), Wiener Linien (Public Transport Vienna), Taxi 31300 (Taxi Service), Car2Go (free-floating carsharing), Emil and Emorail (e-carsharing), Citybike (bikesharing), Tanke (Charging network for eCars) and many other services is a unique achievement. To further strengthen electric mobility and the interconnection with other modes was also a focus of the SMILE project. Ending in May 2015, the project resulted in the successful development and testing of a prototype of an integrated mobility platform open for all types of mobility services, including electric mobility.[[17]](#footnote-17)
* February 2016 saw the launch of the second phase of üstra´s and GVH´s (Greater Hanover Transport Association) ‘Mobility Shop,’ the very first fully operational example of MaaS. The Mobility Shop is a truly multimodal version of the pilot scheme that began in November 2014. The core feature of the service is an integrated workflow that encompasses registration, routing, booking and invoicing for several transport modes (public transport, taxis, station-based and free-floating car-sharing). The service offers users the possibility to tailor the bundle to their individual needs and to directly book their journeys, whether it’s a public transport ticket or a taxi ride with mobility options, including travel times, appearing in real time. All services are then invoiced by üstra via a monthly ‘joint mobility bill’. More flexible than the original pilot, the service is not limited to annual season ticket holders of public transport anymore, thus offering itself towards a much broader share of the ‘multimodal’ target group. At a monthly fee of EUR 9.95, Hannovermobil includes car-sharing membership and heavily discounted rates for car-sharing and taxi use as well as a free Deutsche Bahn discount card (BahnCard 25). Mobility as a Service was a major discussion point at the IT-TRANS event 2016 in Karlsruhe, Germany. The rise of the sharing economy is causing urban dwellers to reconsider how they think about access to goods and services and the need for ownership, particularly of the private car. ‘There are good reasons for owning a car these days and we need to overcome these’, said üstra´s Martin Röhrleef at an IT-TRANS plenary session on emerging technologies. ‘MaaS might be even more attractive than owning a car.’[[18]](#footnote-18), [[19]](#footnote-19)

Bundling services to simplify access to mobility is a key step to ensure the best use of all modes of transport

The transport sector is at the beginning of a period of significant disruption, with new technologies, products and services fundamentally shifting customer expectations and opportunities. The market for Intelligent Mobility is rapidly-developing as customers, transport authorities, businesses and governments understand the huge potential for unlocking major opportunities and improving a wide range of outcomes by taking a user-centric approach to looking at mobility opportunities for customers as part of a wider, integrated system. There is a global discussion about how digitalisation, new technologies and the increasing connectedness of people are potentially changing the transport sector in a fundamental way. Mobility platforms shall enable the integration of the transport modes and the possibility for customers to purchase ‘mobility packages’ granting a defined volume of access to public transport, bike-sharing, car sharing and also taxi services at the same time.

Matthias FINGER, part-time Professor at the Florence School of Regulation and full Professor at the Ecole Polytechnique Fédérale de Lausanne (EPFL) is convinced, that amongst the major changes that have influenced the transport sector in recent years in Europe, the introduction of the Information & Communications Technology (ICTs) is among the most prominent ones. Indeed, the rapid evolution and ever more significant application of the ICTs in the transport sector is a heavy trend which leads to breaking down the boundaries between the different transport modes: as a matter of fact, the ICTs create an intermediate level between the different means of transport and their users, notably thanks to a new data layer. For the users the focus is therefore no longer on the transport mode, but rather on mobility. As a consequence, mobility will increasingly be seen as an information service with physical transportation products, rather than a transportation product with additional services.

Nowadays, ‘mobility’ can be seen in a wider meaning, that of an enabler, as providing the means to multiple ends. The debate is shifting, particularly in the context of cities (and smart cities), from the provision of urban transport networks, to a focus on what urban mobility means, what people actually require, and how a more considered and integrated approach could produce far better outcomes. In its publication ‘Journeys of the Future - Introducing Mobility as a Service’, the Atkins Group[[20]](#footnote-20) provides five key trends that are manifesting this shift in thinking. By tying these points together, we can see how a range of concurrent factors are working together to support and drive these trends across the transport sector. The development, and uptake, of technology is supporting new opportunities for existing businesses as well as allowing new entrants to come into the transport sector. The customer now has greater access to better information as well as more channels for keeping informed and to communicate with transport providers as well as other customers. The transport system as a whole, and those who have a part in it, is becoming more integrated as we see a shift of focus from solely providing the supply of transport to focusing on what and where the demand is and how to cater for it more effectively.

1. Integration and convergence: More modes are being considered as an integral part of transport networks. Walking and cycling are now recognised as key parts of the whole system[[21]](#footnote-21). Furthermore, there is recognition that the modes may start to expand or the distinctions become blurred such as bike-sharing and car sharing as well as with new services such as Uber, Lyft and Bridj.
2. User experience: The user and their experience is now mission-critical. Transport is redefining itself as mobility and is centred around the customer rather than as a provision to the customer. This is a profound shift in emphasis brought about by an increase in information and the ability to share information, as well as by new business models becoming possible thanks to technology and a greater willingness amongst customers to try new things.
3. Access over ownership: Access to mobility rather than ownership of (and long term commitment to) the means of mobility is changing the landscape. The focus on customer experience and the new business models emerging in the transport sector have established a lot of new space for market entry where previously it was much more difficult. Customer expectations and requirements have changed with a greater emphasis on flexibility and on-demand services. Furthermore, the collaborative economy and technological developments will jointly enable customers to be more selective thus continuing this trend.
4. Technology: New technologies are now bringing significant disruption to the established transport sector. It is now possible to integrate journey planning across modes and to provide live, accurate information that customers can rely on. It is also providing new opportunities that are lowering the barriers for businesses and innovators to enter the transport sector.
5. Systems thinking: The whole journey approach, centred around the user, is the underlying driver in these changes. Users themselves are now looking at transport as a whole network and understanding the full range of opportunities available in a more seamless manner. Technology is enabling tools such as Citymapper and Moovit to provide solutions that give users the ability to navigate the transport network more easily.

Out of these five trends, the authors were able to draw seven long term trends that they consider will become norms for the transport sector:

1. Mobility as a service will create a new model for how we buy travel: Travel will be purchased using service contracts. Season tickets will disappear and fares will instead be paid for like mobile phones on pay monthly or pay as you go service contracts with bolt-on extras available to users as needed.
2. The transport sector will split in two: The transport sector will provide more and more integrated, customer-focused services and products. But to do this a distinction will emerge between customer-facing service businesses and the infrastructure and hardware providers supplying the capacity. The model of utility businesses is instructive, customers might have a monthly service contract with company A who may or may not be the actual provider of the service but is purchasing capacity separately from companies B, C and D as required. So the transport system itself could be seen as the equivalent of the national electricity grid with non-customer-facing businesses providing the supply of capacity and services; while customer-facing businesses detach themselves from service provision and instead focus on meeting the customer demand effectively and innovatively.
3. More new business models: Car manufacturers’ primary customers will be themselves, or subsidiaries and other partners, who provide car sharing schemes. This is already emerging with Moovel and the DriveNow scheme.
4. The transport network, and the price of using it, will be actively managed: The transport system as a whole will be more actively managed and dynamically priced based on demand, measured in real time. By recognising that we have limited supply of capacity for travel at certain times and in certain places, there needs to be a greater emphasis on managing that capacity to best effect. This means using technology to provide dynamic pricing based on, for example, the level of congestion, capacity or air quality at a particular point or place in time. This should create better use of the network and free up more capacity by incentivising users to choose when and how to travel based on their various priorities.
5. The end of public vs private transport: Car owners and users will be better connected and integrated with the whole transport system rather than the current ‘us and them’ and ‘war on motorist’ approach. This will enable drivers to connect in with the much wider transport network. It also opens the door to connecting in road use with transport use more broadly and incentivising change.
6. Convergence of different transport modes: Transport modes, such as bus, train or tram will become more blurred as hybrid services develop that cross the distinctions between them. This will be reinforced by customer demand for flexibility that will see more emphasis on switching between modes as well as using the collaborative economy to greater effect.
7. There will be a greater cross-sector emphasis, recognising the wider role of transport: Transport itself will integrate with more aspects of our lives. This will happen in two areas: Firstly, Governments, cities and policy-makers generally will better understand and use the links between improved transport and mobility opportunities and other areas such as better public health and supporting communities; secondly, organisations and businesses will build partnerships to enable opportunities and benefits across sectors, such as local shops benefiting from their location next to a bus interchange to offer live benefits to nearby customers. Jointly, this is the means for encouraging and incentivising the behaviour change needed to better utilise transport capacity across the network.

A final thought: The world is moving towards ‘everything-as-a-service’ thinking. At least in developed economies, the competitive advantage will lie in service business providing smart and advantage services and comprehensive life-cycle solutions. The needs and expectations of the users will continuously become more demanding and fragmented, while the resources for developing transport systems are decreasing. New technologies enable users to take a more dynamic, proactive role as a developer and data producer in the transport system. The user will no longer be the only consumer in the transport system. Instead, the whole transport system will be generated with, to and by the users.

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8. See also CIVITAS Insight 11 - Integrated ticketing and fare policy for public transport [↑](#footnote-ref-8)
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