Covid-19: An Opportunity to Redesign Mobility Towards Greater Sustainability and Resilience?

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Highlights

The Mobility-as-a-Service (MaaS) concept has recently attracted considerable interest among policy makers and the industry for its potential to improve the overall efficiency of the transport system and to reduce reliance on private cars in urban centers. By doing so, MaaS can contribute to the reduction of both CO_2 emissions and pollution, thereby supporting the advancement of the European Green Deal agenda. While the Covid-19 pandemic has brought about unprecedented challenges for the whole transport sector, it has also highlighted the importance of an agile and resilient transport system in ensuring an uninterrupted supply of goods and people. This, in turn, may present important opportunities for accelerating the rollout of MaaS. As a direct result of the crisis, we have seen transport users adapt their travel and working habits, companies expand their functions beyond the transport of people to deliver medicine and food, as well as a more systematic effort by companies to share data to help inform governments' response to the pandemic. Building upon this momentum, by means of a rethinking of public authorities' governing approaches, can help to translate these innovative practices into long-lasting and disruptive changes for the sector.
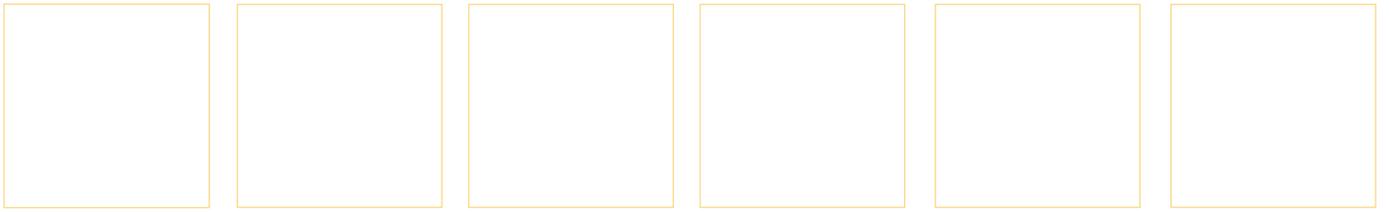
Introduction

With over 70% of EU citizens currently living in urban areas, achieving sustainability of cities has become one of the defining challenges of our times. While urban areas can enable access to important social and economic opportunities, they have also brought about new challenges related to traffic congestion, air- and noise-pollution, and inefficient transport systems. The shift towards smart and more livable cities therefore places a particular responsibility on the transport sector, which accounts for a quarter of the Union's total greenhouse gas emissions and which is a significant contributor to health-damaging pollution in cities. Achieving the European Commission's objective of making Europe carbon neutral by 2050 will require a 90% reduction of transport emissions with sizeable contributions across all modes. In its Green Deal communication, the von der Leyen Commission underlines that the shift to a truly sustainable transport sector would entail "putting users first and providing them with more affordable, accessible, healthier and cleaner alternatives to their current mobility habits"[1].

In parallel to its pursuit of the EU's sustainability agenda, however, the transport sector is confronted with unprecedented challenges triggered by the Covid-19 pandemic and the social distancing strategies implemented to curb its spread. These have not only drastically reduced public transport services but inevitably also act to disadvantage the use of public- and shared- transport, at least in the short-run. In fact, according to data from the urban mobility application Moovit, ridership on major public transportation systems in European cities has dropped by more than 80% since the onset of the outbreak in January 2020. In the hard-hit Italy, public transport ridership has seen decreases in the range between 80% and 90% in every major city[2]. In the short- to medium-term the most urgent priorities will therefore be to address the financial viability of the affected businesses across the industry as well as to ensure the safety of the travelling public once lockdown measures have been phased out.

Notwithstanding, it is precisely during times of emergency as we are facing today, that the paramount nature of a resilient and agile urban transport system, based on Mobility-as-a-Service (MaaS), becomes increasingly obvious in enabling access to health care facilities, while safeguarding an uninterrupted supply of food, medical- and emergency goods. This policy brief discusses current challenges to urban mobility and argues that the Covid-19 pandemic may, in fact, serve as an opportunity for the advancement of the MaaS ecosystem and the demonstration of its true value in supporting the Commission's Green Deal objectives.

The Emergence of the MaaS Concept

It is widely acknowledged that personal and goods transport entail a significant societal and economic cost in the form of environmental and human health impacts, but also accidents, congestion, and infrastructure wear and tear. In fact, the overall size of transport-related external costs is estimated to be around €1 000 billion annually, the equivalent of as much as 7 percent of EU28 GDP[3]. Cost-reflective pricing, regulation and behavioral changes will all have a role to play in internalising these external costs and placing the transport sector on a firm path to climate neutrality. The desired changes, thus, cannot be brought about by the development of a single transport mode or by means of a technological-shift only. In addition, a closer integration of the different transport modes and services will be needed, including both public and private solutions, which, in turn, is at the heart of the MaaS concept.

The MaaS concept dates back to the 2014 ITS Europe Conference in Helsinki, where it was first used to describe an entity offering a mobility package as a subscription service. Subsequently, Finland has pioneered research and financed pilots into the concept. MaaS can be defined as 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. For the user, MaaS can offer added value through the use of a single application to provide

1. European Commission (2019), The European Green Deal, https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

2. Moovit Public Transit Index 2020, https://moovitapp.com/insights/en/Moovit_Insights_Public_Transit_Index-countries, accessed on 17 April 2020

3. European Commission, Directorate-General for Mobility and Transport (2019), Handbook on the external costs of transport, 2019, https://ec.europa.eu/transport/sites/transport/files/studies/internalisation-handbook-isbn-978-92-79-96917-1.pdf

access to mobility, with a single payment channel instead of multiple ticketing and payment operations[4]. As such, MaaS represents a shift towards a more user-centric mobility paradigm given that users are enabled to plan and book their door-to-door intermodal and multimodal trips thanks to a single application which provides real-time journey information and takes into account individual preferences in terms of time, comfort or cost of the trip (Goodall et al., 2017).

A combination of societal and technological trends can be credited for the emergence and growing popularity of the MaaS concept. Firstly, continuous population growth and urbanisation are translating into a growing demand for mobility, which needs to be reconciled with the EU's sustainability and climate objectives. Furthermore, the simultaneous availability of wireless connection, 3G, 4G, and 5G networks and interfaces, such as smartphones and tablets, enable ubiquitous access to shared mobility services for consumers (Nikitas et al., 2017). This rapid penetration of ICTs in the transport sector is increasingly blurring the boundaries between the different transport modes and is, in fact, creating 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 the mobility. Society itself is changing and so are mobility patterns. Driver's licenses and car ownership have seen a downward trend, as it is becoming generally less attractive for citizens to own a car and the motivation for buying one is primarily based on necessity rather than prestige (Finger, Bert and Kupfer, 2015).

## The Role of MaaS in Achieving the Green Deal Objectives

Although a relatively novel paradigm, MaaS holds potential to boost both social and environmental sustainability in cities, while enabling cost-savings for local authorities. The environmental benefits stem from the ability to tackle urban mobility challenges, namely traffic congestion and the consequent air- and noise-pollution, given that MaaS encourages more sustainable transport choices and improves overall system efficiency (Audouin and Finger, 2019). It should, however, be noted that the emission reduction potential of MaaS has been met with reservations by some scholars on grounds that

it may lead to an overall increase in vehicle kilometers travelled in lower-occupancy vehicles (Pangbourne et al., 2018). In view of this, to ensure the environmental integrity of MaaS, it should be accompanied by data-led regulations which seek to increase average vehicle occupancy and thus reduce the number of vehicles in circulation (Voege, 2018). In parallel, the adoption of bold emission reduction targets and climate policy for transport, is another key instrument to ensure that MaaS contributes to the advancement of the climate and sustainability agenda.

According to a study based on the pilot project of the UbiGo MaaS initiative in the city of Gothenburg, Sweden, a majority of UbiGo users reported that they would want to continue their subscriptions and become more positive towards shared urban mobility options as well as public transport, and less positive towards private cars. The study has also shown that the overall number of journeys, performed by private cars, reduced in the city, which in turn, could mitigate traffic issues. MaaS, furthermore, stands to improve social cohesion and inclusiveness by supporting healthier and more active lifestyles. Not least, smarter and more livable cities tend to attract more investment, thus creating new businesses and employment opportunities (Nikitas et al., 2017).

In recognition of these benefits, in its European Green Deal, the Commission promises to develop smart systems for traffic management and MaaS solutions, through its funding instruments, such as the Connected Europe Facility. What is more, the communication stresses that automated and connected multimodal mobility will play an increasing role, together with smart traffic management systems enabled by digitalisation. Evidently, the MaaS concept has been elevated as a priority on the EU policy agenda, and discussions on elements crucial to enabling it, such as EU-wide multimodal ticketing and payments systems, are underway. Notwithstanding, a number of regulatory, technological and cultural barriers remain to be addressed in order to achieve a truly integrated and multimodal mobility architecture based on MaaS. While the emergence of Covid-19 might be stalling progress on some of these fronts, the paragraphs below argue that the pandemic may unveil new opportunities and act as a catalyst for the deployment of MaaS solutions.

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4.   MaaS Alliance (2020), https://maas-alliance.eu/homepage/what-is-maas/, accessed on 19 April 2020
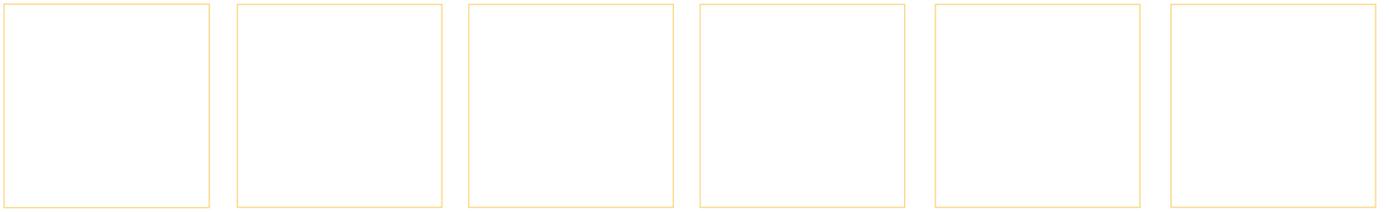
Covid-19: An Opportunity for MaaS?

The global economy is projected to contract by 3 percent in 2020 as a result of the Covid-19 crisis, according to the International Monetary Fund's latest annual World Economic Outlook.[5] Significant reductions in transport usage caused by the pandemic are set to negatively impact many industries in the short- to medium-term, with MaaS being no exception. Companies, governments and individuals are, in fact, already suffering the economic toll of the crisis in the form of loss of sales income, tax revenue and wages. As it is, transport and logistics already account for a significant share of company costs and household expenditures. On average, each person spends €1900 on transport per year, which represents 13 percent of their spending. In light of this, budget cautiousness will certainly increase in aftermath of the crisis. On the flip side, MaaS and personalised mobility could enable transport users to optimise expenditures. By creating a new service layer, MaaS leads to a more efficient use of existing transport infrastructure which in turn stands to benefit both public authorities and private companies. From a local administration perspective it means making better use of existing services by connecting them better with their users, which, in turn, offers important cost-savings.

Covid-19 has, in fact, already generated new ways of thinking and of moving both people and goods around. Industry stakeholders have demonstrated a high degree of creativity by reinventing their business models in response to the drastic drop in mobility demand. To name a few, the Italian sports car manufacturer, Ferrari, has shifted production to make respirator parts, while France's national state-owned railway company, SNCF, has been operating 'hospital trains', i.e., high-speed trains transporting Covid-19 patients and medical supplies[6]. Ride sharing companies and taxis are expanding their functions beyond the transport of people to deliverers of food, medicine and other goods.[7] New technologies such as drones and automated vehicles are proving their suitability in carrying out tasks with the minimum human contact that the present situation calls for.[8]

Transport users, too, have broken their usual habits as manifested through the rapid uptake in teleworking and cycling. Consequently, over the past few weeks, numerous studies have indicated improved air quality and reduced emissions in major metropolitan areas around the globe. According to projections by the OECD's International Transport Forum, greenhouse gas emissions from transport are set to be 20% lower in 2020 than under normal circumstances. What is more, a growing share of people are relying on local supply chains and communities, as they take advantage of e-commerce and delivery services. Albeit unintentionally, the implementation of lockdowns has also led to the sudden creation of space, which, in the busy and congested urban areas of today, is a valuable resource. Some cities have gone on to enhance space allocation to cycling, as a greener and more individual way of travelling in line with social distancing regulations.[9]

A Rethinking of Urban Mobility Governance Models

In order to ensure that these short-term benefits translate into long-lasting and disruptive changes for the sector and city life in general, this calls for a careful evaluation of urban mobility governance models. Congestion issues coupled with the fact that cars are only used for an average of 5% during their lifetime, have already mobilised support among a growing number of cities for a transition "from ownership to usership" (Finger, Bert and Kupfer, 2015). Helsinki has gone as a far as planning to make it unnecessary for any of its residents to own a car by 2025, which in turn, is to be achieved not by means of mandates, but rather by rendering the alternative modes of transport more attractive for residents (Goodall et al., 2017). Covid-19 is an opportunity to act upon this momentum.

5. International Monetary Fund (2020), World Economic Outlook, The Great Lockdown, 2020, https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020

6. International Railway Journal (2020), https://www.railjournal.com/passenger/main-line/sncf-to-further-reduce-services-to-combat-coronavirus-spread/, accessed on 11 April 2020

7. Covid-19: impact on shared mobility, (Movmi Shared Mobility Thoughts, 2020) https://movmi.net/covid-19-shared-mobility/, accessed on 14 April 2020

8. Kim., Y. T. (2020), Transport in the face of the pandemic, (International Transport Forum, 2020), https://www.itf-oecd.org/covid-19/paradigm-shift-transport, accessed on 12 April 2020

9. Covid-19: impact on shared mobility, (Movmi Shared Mobility Thoughts, 2020) https://movmi.net/covid-19-shared-mobility/, accessed on 14 April 2020

Urban mobility policy has traditionally been the responsibility of local authorities. However, our experience with MaaS points to a growing role for the private sector, namely innovative car- and ride-sharing companies as well as e-scooter providers, in driving its development. Therefore, new governance structures involving both the public and private sectors are needed for MaaS schemes to be successful (Audouin and Finger, 2019). The more developed "service layer" integral to the MaaS ecosystem, also implies a shift of certain powers away from the transport providers to new actors. Yet the network operators need to make the investments as well as to generate the profits to make them. In view of this, it should be noted that the MaaS concept is not fully compatible with (and may even compete against) transport services provided through public service obligations, i.e., services of general interest, which receive state subsidies. Governments would thus need to define the business model of MaaS regarding public transport services. Furthermore, it is well known that employer strategies can be a powerful tool for encouraging the use of public transport, through the provision of subsidies or tax reductions to employees choosing public transport over their private car for their daily commute. The same advantages, however, are currently not guaranteed for commuters choosing MaaS. In view of this, a recognition of the benefits of MaaS by local authorities and the enactment of similar corporate or government subsidies and tax reductions can enable MaaS to be successfully implemented (Li and Voege, 2017).

Given its multimodal nature, MaaS enables alternative ways of moving both people and goods about, from public transport to taxis and rental services to micro-mobility, thus enhancing the flexibility and reliability of the mobility network and the community it services (Sochor et al., 2015). Reaping these benefits calls for, among other things, a strategic integration of physical infrastructure so as to enable the seamless transfer between transportation services, such as bus and rail interchanges, or bike and carsharing spaces at stations. This increased integration of the different transport modes in a MaaS ecosystem raises some important questions relating to passenger rights and liability issues. In a multimodal reality, the insurance status of the traveler varies depending on the mode they are using and on the respective passenger right scheme. This can significantly complicate things in the case of interruption at any point of the travel chain for

travel offers that are purchased in packages. Whereas the airline industry has successfully managed to overcome this issue by clarifying liabilities and rights of travelers that book via online platforms or travel agencies, more work remains to be done when it comes to integrating completely different systems such as rail, air taxi and urban public transport (Finger, Bert and Kupfer, 2015).

A Catalyst for Data Sharing?

Transport companies and operators will, furthermore, have to undertake sufficient safety measures (e.g., cleaning, protective screens and spacious seating) with a view to safeguarding the safety of passengers in the transition period towards the 'new normal'. This, once again, presents an opportunity for the uptake of MaaS by enabling access to detailed real-time information on the relative "safety" of alternative trips (e.g., crowding levels, time-in-transit and frequency of cleaning) in order to guarantee that passengers can make informed travel decisions. Though the need for operators and authorities to share high quality and standardised data has long been acknowledged as a precondition to making MaaS a reality, the arrival of Covid-19 has acted to amplify the requirement for data while facilitating its sharing.[10]

Access to various types of mobility data enhances public authorities' visibility over their territories thereby allowing them to better target policies. The sharing of data across transport service providers is also key to enabling multimodality, allowing passengers to fully benefit from the available public and private offerings, and ultimately reducing infrastructure costs. Thus far, however, an important barrier for MaaS has been the lack of trust and willingness to cooperate and share data among public transport operators, providers of shared urban mobility as well as providers of digital interfaces and electronic applications. In part, this can be explained by the fact that transport service providers have been cautious about their services becoming increasingly "commoditised", thus diminishing their ability to build a closer relationship with travelers (and to gather data

10. Witzel, S., (2020), From lockdown to lifeline: how overcoming COVID-19 can kick-start the Mobility-as-a-Service revolution, (Skedgo, 2020), https://skedgo.com/from-lockdown-to-lifeline-how-overcoming-covid-19-can-kick-start-the-mobility-as-a-service-revolution/, accessed on 14 April 2020

on them), thereby resulting in missed opportunities for more efficient pricing (Montero and Finger, 2018).

Interestingly, since the start of the outbreak, we have started witnessing a more systematic effort by private companies to share data with governments. In the UK, for example, the Department of Transport and ITS UK have worked together to collect data on traffic flow, traffic movements, parking, cycling and pedestrian movements to help inform the Government's policy response to the pandemic.[11] This is just one of many examples of public-private partnerships formed to foster evidence-based decisions to help combat the pandemic.[12]

Having said that, outstanding issues remain to be addressed in relation to data sharing. These include the standardisation of data exchange formats, while, at the same time, securing sufficient flexibility to incorporate new systems as they are being developed. Public authorities have a clear role to play in facilitating data sharing by establishing the necessary standards. Standards are key to guaranteeing the quality of data while bringing down the costs linked to its exchange. The increase in the use of ICT-based transport services also carries risks which need to be addressed. Those who have access to the data and thus control the information, have immense power. This, in turn, means that the data and information are at risk of abuse which can result in market distortions, security risks, and diminished privacy protection, among others. This, of course, touches upon the controversial question of who should be entitled to set up digital platforms. To achieve a fully transparent and equal system an independent body would have to be in charge of this task in the future (Finger, Bert and Kupfer, 2015).

While EU action has clear limits in the local and municipal spheres, where the subsidiarity principle safeguards Member States' competence to take legislative actions and decisions, reaping the full benefits of MaaS rollout calls for a coordinated approach continent-wide. In view of this, Sustainable Urban Mobility Plans (SUMPs), as the cornerstone of the Commission's urban mobility policy, can be a powerful tool to aid this by incorporating wider current and future technological developments, such as automation and ITS, MaaS, and shared mobility.

Conclusion

Only an agile mobility system that can serve a diverse set of needs will be resilient and sustain its ability to transport people and goods even at times of emergency – be it a pandemic, an environmental disaster or other. By matching mobility 'supply' with 'demand', MaaS operators can optimise the use of transport infrastructure and the overall efficiency of the transport system. This, in turn, translates into numerous socio-economic and environmental benefits such as a reduction of congestion, higher productivity, lower emissions and better air quality, fewer traffic accidents, and a smaller urban footprint for parking.

While the Covid-19 crisis has profound implications for the global economy and transport network, it has also resulted in a high degree of creativity in responding to the crisis, as manifested through changes in business models across the industry, altered habits of transport users, as well as the more concerted effort by private companies to share data so as to help shape evidence-based government policies and decisions in response to the pandemic. Building upon this momentum can help to pave the way towards a more sustainable, integrated and reliable mobility system, while helping to advance the Commission's decarbonisation and digitalisation agendas. MaaS represents a paradigm shift, and this calls for a departure from the silo-approach in regulating mobility, to reflect the much closer integration between transport modes and services.

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11. Seymour, T. (2020), DfT urgently collects UK transport data to support COVID-19 response, (Smart Transport, Connecting Policy to Solutions, 2020) https://www.smarttransport.org.uk/news/latest-news/dft-collates-transport-data-to-support-covid-19-response, accessed on 14 April 2020

12. Kim., Y. T. (2020), Transport in the face of the pandemic, (International Transport Forum, 2020), https://www.itf-oecd.org/covid-19/paradigm-shift-transport, accessed on 12 April 2020

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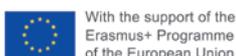*FSR-Transport:*
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