# Why Only Collaboration Can Push Mobility as a Service to the Next Level

## FINDINGS FROM THE FUTURE OF MOBILITY ROUNDTABLE AT THE 51ST ST. GALLEN SYMPOSIUM 2022


ST.GALLEN SYMPOSIUM

BCG BOSTON CONSULTING GROUP

University of St.Gallen
Institute for Mobility

# Imprint

The **St. Gallen Symposium** is one of the world's leading initiatives for cross-generational dialogue on economic, political and social themes and developments. For more than 50 years, established leaders and visionaries have been brought together with extraordinary young talents in St. Gallen and at global locations, as well as in digital formats. Together, they address the chances and challenges of our time and work on finding solutions.

The St. Gallen Symposium is a student initiative. Under the strategic guidance of the St. Gallen Foundation for International Studies, the International Students' Committee – a team comprised of about 30 students from the University of St. Gallen (HSG) – drives the dialogue between generations. During the symposium, 500 HSG students support the exchange of ideas.

**Boston Consulting Group** partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we work closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organisations to grow, build sustainable competitive advantage, and drive positive societal impact.

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**The Institute for Mobility (IMO-HSG)**, one of 40 research institutes and centres at the University of St. Gallen, builds on profound scientific expertise to investigate the future of mobility and the underlying business models from an economic perspective.

The Institute follows a behaviour-oriented approach that focuses on the users of mobility. Great importance is given to the transfer of scientific insights into practice, especially into industry and politics. In a variety of research projects – often in cooperation with international, well-recognised actors of the mobility sector – IMO-HSG provides actionable insights into a wide range of subjects such as smart mobility, mobility-as-a-service, micro mobility, corporate mobility, urban planning as well as autonomous and inclusive mobility.


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# Table of Contents

# Introduction

Collaboration and dialogue are the cornerstones on which the St. Gallen Symposium (SGS) was founded over half a century ago. The **51st St. Gallen Symposium's theme of "Collaborative Advantage"** framed insightful discussions between senior and young leaders on a variety of global issues.

It was in this context that the Future of Mobility Roundtable – hosted by the St. Gallen Symposium, the Institute for Mobility at the University of St. Gallen (IMO-HSG) and Boston Consulting Group (BCG) – was held for the first time. **Twelve leaders came together to discuss one of the most promising approaches to the mobility problem: Mobility as a Service (MaaS).** They gathered to share best practices, highlight current pain points and derive recommended actions to make MaaS a success.

Throughout the COVID-19 pandemic, traffic volumes declined sharply in many cities around the world.[1] Yet, evolving mobility behaviour – that global lockdowns and other measures have caused – cannot disguise the fact that mobility ecosystems across the world are under constant strain, demanding immediate action to address climate change, avoid economic damage, and do what they were created for: to serve people. To meet these manifold challenges, mobility experts around the globe agree that **collaboration between all players in the mobility ecosystem is key to success.**[2,3]

This White Paper presents the key findings from the discussion at the Future of Mobility Roundtable. It showcases **best practices and highlights current pain points in the MaaS ecosystem.** And it derives recommended actions, calling on the key players to collaborate, to transform MaaS from a promising vision into successful reality.

# Why MaaS? How MaaS Can Fix the Flaws in Our Transportation System

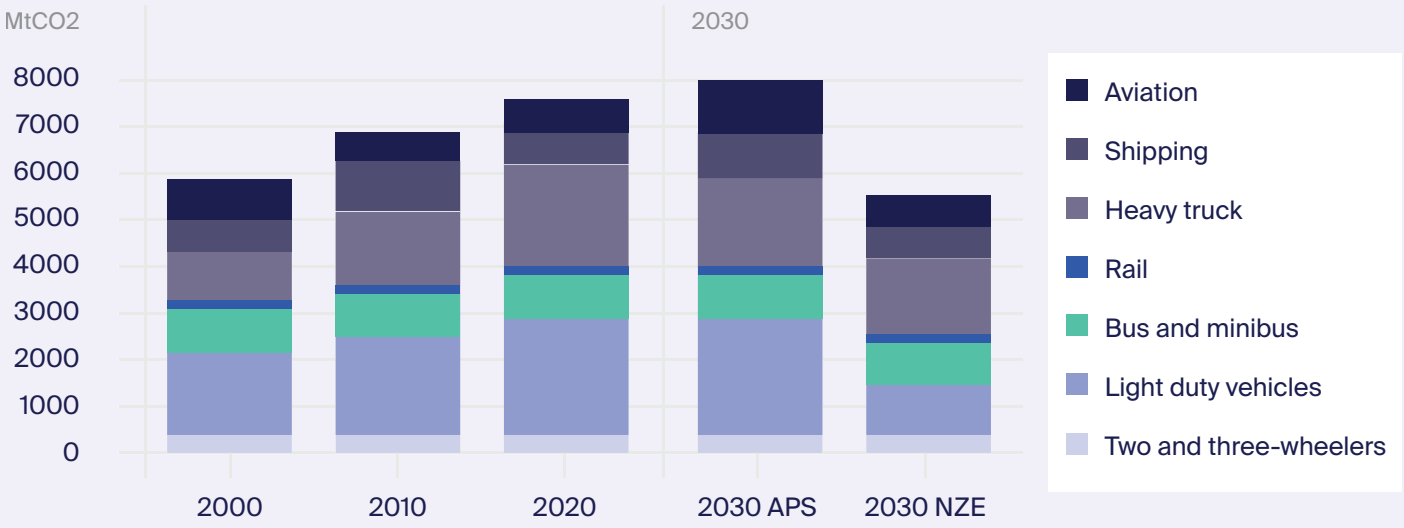


Exhibit 1: Global greenhouse gas emissions from the mobility sector by subgroup, 2000-2030.
Source: IEA, 2021[6]

## MAAS CAN HELP OVERCOME THE DEFICITS OF THE MOBILITY SECTOR

**The mobility sector's development has led to severe consequences for the environment, society and the economy.** In many places around the world, the enormous volume of traffic brings transportation systems to the brink of collapse on a daily basis.[4] This entails ecological, social and economic costs.

### Ecological costs

Climate change is undoubtedly the greatest threat to humanity, with the transportation sector contributing about one-fourth to total CO2 emissions (8.5 Gt in 2019[5]). Despite global awareness of the need to reduce emissions and the dramatic consequences of the COVID-19 pandemic, the global transportation sector's emissions increased by ~ 28% from 1990 to 2020. Achieving the International Energy Agency's Net Zero Emissions by 2050 Scenario will require the transportation sector to reduce emissions by ~ 22% by 2030 (see exhibit 1). Yet emissions are even expected to further increase by ~ 11% by 2030, taking all announced pledges for reduction already into account.[6]

The steadily growing mobility sector causes many issues aside from high emissions. Land sealing is one of the most pressing ones. In Germany, for example, demand for transportation infrastructure consumed six hectares of space per day in 2020, adding up to more than 1,500 football pitches in one year.[7] This ever-increasing demand for land leads to more and more sealed surfaces, increasing the risk of major floods and environmental disasters as key consequences.

### Social costs

After emissions, the World Health Organization names noise pollution as the second most harmful stress factor for the environment. In Europe, about 100 million people are affected by road noise in a harmful way.[8]

The mobility sector also has a dramatic impact on human lives and well-being globally. Every year, it causes over ~ 1.3 million deaths directly attributable to road traffic.[9]

Furthermore, the current mobility system excludes a significant amount of the world's population. Marginalised groups, such as the ~ 1 billion individuals with disabilities (~ 15% of world population), often experience poor access to mobility options and hence suffer social, cultural, and economic exclusion.[10]

### Economic costs

The overloaded mobility sector has both primary and secondary economic consequences. First, congestion leads directly to economic losses in both goods and passenger traffic. Total cost of infrastructure congestion in the UK amounted to £3.5 billion in 2021 (for goods and passenger traffic). Drivers in the UK lost an average of 73 hours in traffic congestion even during the pandemic in 2021 (figures were as high as 115 hours before).[11] Second, transportation – as one of the main emitters – makes a decisive contribution to economic costs that arise from the consequences of climate change. Swiss Re Institute, for instance, expects climate change to consume roughly one-fifth of global GDP by 2050 if temperatures rise by more than 3°C.[12]

Furthermore, the previously mentioned social cost of road injuries naturally comes along with economic consequences. Global cost of road injuries between 2015 to 2030, for instance, are expected to add up to $1.8 trillion.[13]

**MaaS can help overcome the deficits of the mobility sector.** MaaS enables end-to-end transport by combining new and traditional mobility solutions (private and public) through a user-centric, digital interface. It can help to overturn the deficits of the mobility sector described above. In a fully developed stage, a functioning MaaS ecosystem has threefold potential to offer.

### Ecological potential

MaaS has the potential to significantly reduce traffic congestion and total emissions. The number of private cars on the streets decreases when travellers use intermodal options. Instead of their own car, MaaS users would use metro and on-demand shuttles (in the future also autonomous) for the first and last mile – all seamlessly at the click of a button. Ride-pooling (enabled through a MaaS platform) also relieves road infrastructure, because it increases seat utilisation of motorised vehicles. In addition, digitising mobility allows mobility data to be used for improved capacity planning and real-time monitoring of infrastructure utilisation.

> "There is considerable momentum for mobility services. The MaaS market is expected to account for $1.1 trillion by 2027!"
>
> **PROF. NIKOLAUS LANG**
> **MANAGING DIRECTOR AND SENIOR PARTNER, BOSTON CONSULTING GROUP**

### Social potential

Fewer vehicles on the roads leads not only to a reduction in emissions. Less congested infrastructure can also contribute to fewer accidents and consequently less casualties. Advanced safety schemes (e.g., collision warning systems) and improved traffic management make other positive contributions.

In addition, innovative MaaS solutions such as autonomous on-demand shuttles promise new ways of granting access (e.g., to economic resources) to those who have previously been excluded.[14]

### Economic potential

Reduced traffic congestion and less loaded infrastructure is the key to reducing economic losses in both goods and passenger traffic. As a key emitter, the mobility sector can contribute significantly to counteracting climate change and its economic consequences by reducing overall emissions.

**Favourable momentum should be used to move MaaS from theory to practice.** MaaS is not a self-serving theoretical concept, but as a

business model it has yet to prove its profitability. By 2027, the market volume for MaaS applications such as planning, ticketing, traffic management and toll systems will amount to $100 billion. Combined with revenues for transportation companies, the MaaS market will account for $1.1 trillion in total (the global automotive market accounted for $2.7 trillion in 2021).[15]

In light of the urgency to take action against climate change, conditions for such action are particularly favourable right now, in the final phase of the pandemic. The pandemic changed our mobility behaviour. Telecommuting and remote teaching led to decreased mobility needs. Commuters switched from public transit to cars out of fear of infection. Now, working and learning in person is about to return, at least partly. Many people are about to redefine their new mobility patterns. Daily commuting will most likely not be the case for a majority of the workforce[16], putting MaaS even more clearly on the table a viable option. The momentum of change in this (hopefully) final phase of the COVID-19 pandemic should now be leveraged to bring that sizable MaaS market to life.

# What is MaaS? Key Players in the MaaS Ecosystem

MaaS enables end-to-end transport combining new and traditional mobility solutions (private and public) through a user-centric, digital interface. It relies on a digital platform that integrates different modes of transportation with other technological systems (e.g., traffic control) to support all aspects of commuter journeys, from real-time planning to scheduling optimised transit to seamless ticketing and payment.

## FIVE LEVELS WITHIN THE MAAS ECOSYSTEM

BCG and the World Economic Forum (WEF) introduced a five-level MaaS scheme showcasing the technological systems and its key players within the MaaS ecosystem back in 2014.[17] Fundamentally, five different levels interlock to offer the end user with the most seamless digital interface possible for the entire travel experience (see exhibit 2).

### Transportation modes

All forms of transport can contribute to the offering in a MaaS ecosystem. Both private (e.g., providers of car-sharing, e-scooter-sharing or on-demand shuttles) and public transportation options (e.g., subway, tram and bus) play an important role. Public transport typically represents the backbone of MaaS systems,[18, 19, 20] since it is a proven solution for high-volume, schedule-driven mass transportation. Private transportation modes contribute either by complementing last-mile solutions or offering more direct and flexible transportation modes (compared to public transport).

### Collection of mobility data

In a well-functioning MaaS ecosystem, all available modes of transportation and the respective infrastructure are equipped with data collection assets as a base for an optimised MaaS solution. Different sensors (e.g., GPS or visual sensors) gather data from transportation modes, like information on location and utilisation of on-demand shuttles. Collection systems on the related infrastructure gather data, such as via ANPR (automatic number-plate recognition) to analyse the current congestion status of road infrastructure.

### Storage and provision of mobility data

This data is collected, processed and transferred in real time. Data from individual sources is bundled and provided to transportation control systems.

### Transportation control system

Transportation control systems bundle and interpret data to enable transportation operators or authorities to take concrete action and empower providers of transportation to manage their fleet, schedule their

operations and define pricing mechanisms. There are three system archetypes that can be found. Citywide traffic monitoring and control systems provide an overall view of the traffic situation and enable infrastructure demand forecasting for cities on a comprehensive level. Private vehicle road management allows authorities to monitor and actively steer private vehicle traffic (e.g., dynamic route tolls). Transportation mode–specific traffic and fleet management allows operators to act on the real-time or predicted status of their fleet (e.g., utilisation rate of car-sharing fleet) and enables them to schedule their operations. It also defines mechanisms for dynamic pricing and provides ticket engines to sell the respective mobility service to customers, representing the key backbone for the user interface.

### User interface systems

An integrated proactive intermodal travel assistant (IPITA) combines all real-time and predicted information of transportation modes and infrastructure in a single, digital interface for the consumer. IPITA features four key functionalities offering consumers seamless and easy travel from A to B:

- Personalised intermodal planning and scheduling
- Intermodal ticketing and payment
- Passenger information system (for real-time journey status)
- Customer service and value-added services (beyond transportation, e.g., entertainment)

### The Mobility as a Service Ecosystem

Illustrative MaaS scheme...

...and key players

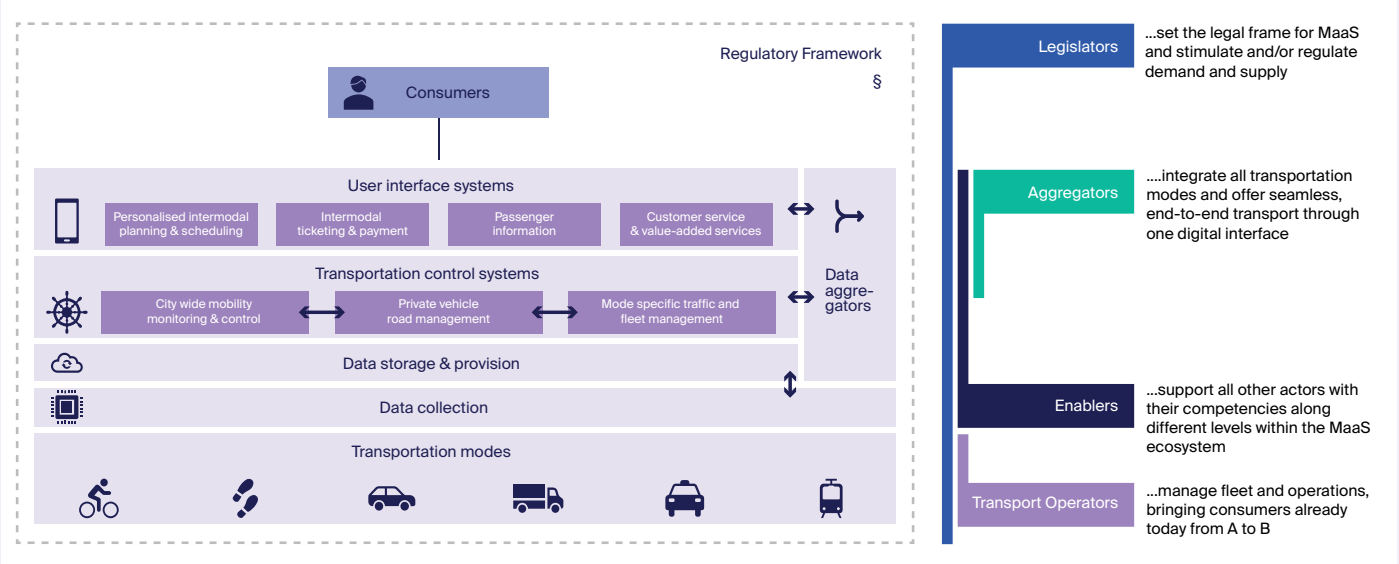


**Exhibit 2:** Illustrative MaaS scheme and its key players. Source: Own illustration based on Boston Consulting Group, 2016[21]

# FOUR KEY PLAYERS ACT WITHIN THE MAAS ECOSYSTEM

### Transport operators

Transport operators manage their fleet (e.g., vehicles or rolling stock) and operations, ensuring that they can transport passengers from A to B. While they traditionally offer their services directly to consumers, they take on a supplier role in a MaaS ecosystem, integrating their transportation modes to MaaS providers. Both private and public operators participate in MaaS.

### Enablers

Enablers are private or public players supporting all other actors with their competences along different levels within the MaaS ecosystem. Data providers support transport operators in collecting mobility data but also collect it themselves via on-device (e.g., mobile data) or infrastructure (e.g., CCTV) data collection systems. IT providers provide both hardware and software for cloud computing, which is of paramount importance for gathering, consolidating and interpreting data in real time. ICT providers offer high-performance network technology across the entire operating area. Providers of personalised intermodal journey planners provide MaaS AI-enabled software allowing individual planning of multimodal trips. Providers of intermodal ticketing and pricing solutions provide seamless payment solutions for journeys across all available transportation modes.

### Aggregators

Aggregators provide MaaS to consumers. They integrate all different transportation modes and offer seamless end-to-end transport through a single digital interface. Their exclusive contact with consumers endows MaaS providers with a unique role and power. Various players try to win the race of becoming the key aggregator. Players like Moovit started off to become MaaS aggregators from the very beginning. Others commenced the race from very different starting points. Sixt Share, for example, began as a transport operator, offering free-floating car-sharing to their customers and has developed their solutions to full-scale MaaS. Berlin public transport provider BVG started as conventional provider and now provides access to a variety of private and public mobility options through their app Jelbi.

### Legislators

Legislators have a twofold role in the MaaS ecosystem. On the supply side, legislators lay the foundation for strategic (e.g., collaboration and service level) and operative (data protection and technical integration) design choices for all players in the MaaS ecosystem. On the demand side, legislators can stimulate and regulate demand for MaaS by creating different kinds of incentives (e.g., road tolls).

# Where Do We Stand? Key Pain Points in the Current Development Stage of MaaS

The first Future of Mobility Roundtable at the 51st St. Gallen Symposium brought together leaders representing all players from the MaaS ecosystem (see exhibit 3).

## Participants of the Future of Mobility Roundtable

| | |
|---|---|
| Legislators | Markus Traber, Head of Office, Office of Mobility and Transport of the Canton of Zurich |
| Aggregators | Judith Häberli, Co-Founder & Chief Executive Officer, Urban Connect AG<br>Raphael Krucker, Chief Executive Officer, Andermatt Swiss Alps AG<br>Dr. Jana Plananska, Founder, Expert and Independent Consultant, JP Mobility Solutions GmbH |
| Enablers | René Arnold, Vice President Public Affairs Strategy, Huawei<br>Peter Voser, Chairman of the Board of Directors, ABB Ltd<br>Dr Fabian Ziegler, Managing Director, Shell Companies in Germany |
| Transport operators | Véronique Stephan, Head of Passenger Services Markets, SBB AG<br>Dorothea von Boxberg, Chief Executive Officer, Lufthansa Cargo<br>Piergiorgio Cecco, Regional Operations Manager, Genesis Motor Europe GmbH<br>Merlin Ouboter, Co-Founder & Chief Marketing Officer, Microlino AG<br>Hui Zhang, Group Vice President, NIO |
| Roundtable Hosts | Prof. Dr. Nikolaus Lang, Founder & Director, BCG Center for Mobility Innovation<br>Prof. Dr. Andreas Herrmann, Institute for Mobility, University of St. Gallen<br>Dr. Hans-Peter Kleebinder, Institute for Mobility, University of St. Gallen<br>Lukas Schmid, Programme Design Team, St. Gallen Symposium |

Exhibit 3: Participants of the Future of Mobility Roundtable at the 51st St. Gallen Symposium

While the theoretical concept of MaaS appears promising, the roundtable discussion focused on obstacles that hold MaaS back from gaining full traction across cities. Four key pain points hinder the large-scale success of MaaS (see exhibit 4). This chapter summarises the findings for each pain point by presenting the selective perspectives of relevant MaaS players participating in the roundtable.

## Four Key Pain Points Hinder the Full Deployment of MaaS

Key pain points

| | | |
|---|---|---|
| Users are yet reluctant to change mobility behaviour | **Aggregators:** | MaaS providers struggle to attract users to their solutions |
| | **Transport operators:** | Public transit struggles to win back passengers after pandemic |
| | **Legislators:** | Authorities are still searching for the proper way to influence users' choice |
| Integration of planning, scheduling, ticketing and payment still lacking | **Aggregators:** | Public and private providers stick to their own ticketing and payment systems |
| | | Variety of player interfaces impedes integration of planning and scheduling |
| | **Transport operators:** | Legacy hardware prevents public transit from integrating into MaaS platforms |
| Key MaaS players often lack agility and strategic momentum | **Aggregators:** | MaaS at current development stage not yet a profitable business model |
| | **Transport operators:** | Private operators strategically unwilling to integrate into other platforms |
| | | Lengthy decision processes of public transit providers risk losing momentum |
| Insufficient legal framework hinders cooperation and integration | **Enablers:** | Vague data protection laws impede effective data processing |
| | **Transport operators:** | Sharing economy concept not adequately represented in legal framework (e.g., tax) |
| | **Aggregators:** | Consumer aspects not yet fully legally incorporated (e.g., rights in case of delays) |

Exhibit 4: Key pain points hindering the full deployment of MaaS

## 1. USERS ARE YET RELUCTANT TO CHANGE MOBILITY BEHAVIOUR

One of the most pressing challenges is to convince hesitant consumers of the benefits MaaS has to offer. While aggregators and operators struggle to attract them to their solutions, legislators are continuously exploring appropriate measures to influence mobility behaviour effectively.

**Aggregators:**

**MaaS providers struggle to attract users to their solutions**. From an aggregator's perspective, habitual mobility behaviour – especially, yet not only, on a daily commute – is a major barrier to success of MaaS. Mobility behaviour is generally repeated over a long time, and confidence in new alternatives is poor to non-existent.

Hence, aggregators can only count on a low error tolerance among customers when successively introducing MaaS. From an aggregator perspective, a few not entirely satisfactory experiences (e.g., missed connection on multimodal journey) can be enough to completely lose consumer trust – often for good.

"We have trained our mobility behaviour over generations, doing the same for 130 years. MaaS requires long-lasting efforts by all players to convince consumers."

**PROF. ANDREAS HERRMANN**
**DIRECTOR, IMO-HSG**

**Transport operators:**

**Public transport struggles to win back passengers after the pandemic.** Towards the (hopefully) end of the COVID-19 pandemic, public transport is still struggling to gain back customers. General fear of public health risks and the newly discovered convenience of individual mobility (often a personal car) keep customers presumably as much away from returning to public transport as do new modes of collaboration at work (e.g., permanent work-from-home set-up). With public transport representing the backbone for MaaS systems (see chapter 2), a significant rush for MaaS solutions is difficult to achieve in the foreseeable future.

**Legislators:**

**Authorities are still searching for the proper way to influence users' choice.** In their approach to convince hesitant consumers, legislators still struggle to identify, test and successfully implement effective measures to steer customers towards more resource-saving mobility behaviour. Measures often lack in effectiveness or are not implemented consistently enough – presumably often out of concern for the results of the next election. The reasons for this concern are manifold. Objective reasons (e.g., lack of alternatives for people in suburban or rural settings) play just as much a role as subjective ones (e.g., culture of individually owned vehicles).

## 2. INTEGRATION OF PLANNING, SCHEDULING, TICKETING AND PAYMENT STILL LACKING

High complexity across the diverse and ever-changing MaaS landscape mostly hampers seamless journeys for MaaS customers. Typical chicken-and-egg problems and legacy hardware lead to a lack of integration for ticketing and payment systems as well as different operating systems for planning and scheduling.

**Aggregators:**

**Public and private providers stick to their own ticketing and payment systems.** A key promise to MaaS customers is to not only plan and schedule but also pay the entire journey through a single interface with a single ticket. However, it is this very intermodal ticketing and payment solution that is missing in almost any MaaS solution today. This results in interfaces either preventing consumers from seamlessly paying for several transportation modes within one trip or offering them only single-mode trip options. In many cases, this lack of integration leads to somewhat bizarre situations in which travellers pay even more to cover the last mile than they paid for the long-haul travel earlier on their journey.

**Variety of player interfaces impedes integration of planning and scheduling.** Due to its dynamic nature, the landscape in the MaaS ecosystem is extremely diverse and ever changing. Providers of traditional transportation modes (e.g., public transport) meet new players, such as providers of ride-pooling or e-scooter-sharing. Consequently, all players perceive the current MaaS ecosystem as extremely complex. This leads to many chicken-and-egg problems when integrating different operations such as real-time fleet management or delay management, preventing customers from planning and scheduling intermodal trips seamlessly.

**Transport operators:**

**Legacy hardware prevents public transport from integrating into MaaS platforms.** In many cases, outdated technology in infrastructure or assets – caused, for example, by years of investment backlogs in public administration – does not allow for complete integration of public transport into MaaS. Yet, this integration would be necessary to enable seamless transitions in multimodal trip solutions.

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## 3. KEY MAAS PLAYERS OFTEN LACK AGILITY AND STRATEGIC MOMENTUM

Many players in the MaaS ecosystem do not pursue their strategic MaaS ambitions with consistency and risk losing momentum in becoming an integrated MaaS player. One key hurdle is the current lack of profitability. Little willingness to cooperate and long decision-making processes also prevent MaaS from becoming successful.

**Aggregators:**

**MaaS at current development stage not yet a profitable business model.** From an aggregator's perspective, MaaS will only be economically viable when the entire MaaS value chain can be integrated. This includes everything from planning to payment as well as incentive management, such as nudging customers to travel during off-peak times (e.g., driven by regulations). Only a comprehensive solution (often in combination with a relatively large number of consumers) would allow MaaS providers to operate their business in the black. In the current state, however, lacking profitability discourages players from consistently developing a full-scale MaaS solution, which in turn prevents significant numbers of converted customers from turning their backs on their ownership-focused mobility behaviour.

**Transport operators:**

**Private operators strategically unwilling to integrate into other platforms.** Apart from

lacking technical skill sets, many transport operators are unwilling to integrate into MaaS ecosystems. Many players have yet to find their ultimate strategic position. Fear of becoming "only" a potential supplier of a new superaggregator, and/or of unprofitable operations of current MaaS initiatives, has made many private players hesitant to expand to full-scale MaaS. This leads to the aforementioned vicious circle of unmet customer needs and unprofitable operations. Moreover, other players (e.g., from aerospace) are just beginning to identify their specific MaaS playing field and their positioning in this field.

"All essential stakeholders, from public and private sector, should consistently, transparently and jointly pursue the same vision – without a hidden agenda!"

**RAPHAEL KRUCKER**
**CHIEF EXECUTIVE OFFICER, ANDERMATT SWISS ALPS AG**

**Lengthy decision processes of public transport providers risk losing momentum.** In addition to strategic uncertainties, the notoriously slow-grinding mills of public administration can further hinder the development of MaaS. This leads not only to the abovementioned technical barriers (due to legacy hardware), but it often prevents public transport authorities from pragmatically testing and launching new mobility solutions in an innovative and agile manner.

## 4. INSUFFICIENT LEGAL FRAMEWORK HINDERS COOPERATION AND INTEGRATION

Non-existent or deficient legal parameters diminish the willingness and ability of MaaS players to enter successful partnerships, ultimately leading to poor experiences for MaaS consumers. The ambiguous legal situation regarding data processing hinders cooperation, as does the inadequate integration of the sharing economy principles into law (e.g., tax). Furthermore, clarification is needed on regulations that directly affect consumers (e.g., rights in case of delay).

**Vague data protection laws impede effective data processing.** The cautious interpretation of intrusive data protection regulations impedes fast MaaS development. Many roundtable participants reported problems in the operational implementation of current data protection regulations. Consequently, incalculable liability risks in case of violations lead to hesitant collaboration efforts between players (especially public).

"The collaborative advantage for MaaS is in the data. We need to collect views and share data to make true MaaS happen at scale."

**RENÉ ARNOLD**
**VICE PRESIDENT PUBLIC AFFAIRS STRATEGY, HUAWEI**

**Transport operators:**

**Sharing economy concept not adequately represented in legal framework (e.g., tax).** Both public and private players in the MaaS ecosystem perceive the current legal base also beyond data as severely insufficient. According to roundtable participants' experience, basic concepts of the sharing economy seem to be incorporated into tax laws but in a limited or unsatisfactory manner, leading to significant financial uncertainties for operators of transportation modes and other MaaS players.

**Aggregators:**

**Consumer aspects not yet fully legally incorporated (e.g., rights in case of delays).** Looking at consumers, the insufficient legal framework hinders the development of MaaS. Unclear interpretation of passenger rights (i.e., accountability of MaaS provider to providers of transportation modes to consumers in case of delays) complicates the formation of partnerships among MaaS players, which ultimately results in unsatisfactory offers for consumers.

# What To Do? Recommended Actions to Make MaaS Successful

The current pain points of MaaS are diverse and intertwined. Although at least the existence of (limited) MaaS solutions proves that MaaS is not a distant vision but can become reality if players come together and collaborate. Based on the roundtable discussion, this chapter recommends actions for overcoming the hurdles and gives actionable instructions to relevant key players (see exhibit 5).

**All Players Need to Take Action to Bring MaaS to Success**

Recommended actions

| | | |
|---|---|---|
| Convince users with carrot-and-stick approach and successful showcases | **Aggregators:** | Leverage favourable situations (e.g., tourism and B2B) to launch MaaS successfully |
| | **Transport operators:** | Gain user confidence by gradually implementing successful mobility services |
| | **Legislators:** | Leverage effective incentives (carrot-and-stick) and support recovery of public transit |
| Open up to technical and commercial collaboration for next-level MaaS | **Transport operators:** | Enable integration of ticketing and payment systems (public and private) |
| | **Legislators, enablers & transport operators:** | Drive standardisation for full interoperability of planning and scheduling systems |
| | | Upgrade public transit's legacy hardware and integrate operations into MaaS platforms |
| Define individual MaaS strategy and pursue implementation | **Aggregators:** | Advance current offering towards full-scale MaaS business models |
| | **Transport operators:** | Define your own MaaS role and pursue a more collaborative and agile strategy |
| | **Legislators:** | Create incentives for collaboration and tie licence/tender awards to integration |
| Establish the legal base for successful cooperation and integration | **Legislators:** | Put legally secure yet implementable data regulations in place |
| | | Lay foundation for collaboration by fully incorporating MaaS (e.g., tax, passenger rights) |
| | **All other players:** | Support legislators in creating legal base through collaborative efforts |

Exhibit 5: Recommended actions to advance the implementation of MaaS

## 1. CONVINCE USERS WITH CARROT-AND-STICK APPROACH AND SUCCESSFUL SHOWCASES

When it comes to consumer behaviour, positive experience is key for change. Therefore, aggregators should leverage favourable conditions to launch MaaS in specific use cases. Transportation operators can support by getting their customers used to mobility services gradually. Legislators must find the right balance between carrot and stick to influence behaviour and should do everything to bolster public transport as the backbone of MaaS.

**Aggregators:**

**Leverage favourable situations (e.g., tourism and B2B) to launch MaaS successfully.** Their MaaS solutions by leveraging favourable contextual conditions in which behavioural change is relatively easy to achieve. Small-sized, event-specific MaaS projects promise successful collaboration and integration due to their more concise landscape of relevant MaaS players. The Next Generation Conference Mobility project of the St. Gallen Symposium is one such pilot project. Similarly, B2B MaaS solutions reduce the number of stakeholders significantly. Furthermore, touristic areas often promise success for MaaS. Tourists are naturally forced to break their mobility patterns when finding themselves in unfamiliar places. Alpine Mobility with its MaaS pilot concept in the Gotthard tourist region serves as a promising example.

**Transport operators:**

**Gain user confidence by gradually implementing successful mobility services.** Transport companies can support the gradual break-up of rigid mobility behaviour by gradually introducing consumers to "as a service" solutions. NIO, for example, is embracing "battery as a service" for its electric vehicles, decoupling the battery from purchasing the vehicle and offering customers convenient battery swap options. Genesis promotes a new automotive service model with its concierge service, convincing customers of the benefits of not owning a car.

"MaaS can help to solve some of the environmental challenges, yet the degree of convenience will be key to success."

**HUI ZHANG**
**GROUP VICE PRESIDENT, NIO**

**Legislators:**

**Leverage effective incentives (carrot-and-stick) and support recovery of public transit.** Legislators should create measures incentivising the use MaaS in two ways. Positive incentives would encourage users to try MaaS offerings and to see the benefits ("carrot" – e.g., free welcome credit for new MaaS solutions). Negative incentives would guide consumers towards MaaS in a more forced manner ("stick" – e.g., dynamic road tolls).

## 2. OPEN UP TO TECHNICAL AND COMMERCIAL COLLABORATION FOR NEXT-LEVEL MAAS

The often-cited seamless consumer experience is key to raising MaaS to the next level. For this benefit to materialise, transportation operators need to integrate distribution and pricing into MaaS platforms. Enablers jointly with transport operators and legislators should drive interoperability of operations forward. Public transport needs to upgrade legacy hardware in order to enable full integration into MaaS.

**Transport operators:**

**Enable integration of ticketing and payment systems (public and private).** Providers of transportation modes must consistently make their own solutions MaaS compatible. This involves breaking with the strategy of exclusive distribution, opening up pricing schemes for intermodal trips and integrating payment options into aggregators' MaaS platforms.

**Transport operators, enablers and legislators:**

**Drive standardisation for full interoperability of planning and scheduling systems.** Enablers – in collaboration with transport operators and legislators – can play a major role in standardising interfaces between operating systems. This standardisation is key to providing customers the seamless booking and travel experience MaaS can offer.

**Upgrade public transit's legacy hardware and integrate operations into MaaS platforms.** Being well aware of the tense financial situation of public budgets due to the pandemic, public transit authorities have no alternative but to digitally upgrade their legacy hardware. Without this integration, necessary MaaS features such as real-time planning and re-scheduling in case of delays on intermodal trips is simply not feasible.

## 3. DEFINE INDIVIDUAL MAAS STRATEGY AND PURSUE IMPLEMENTATION

There is little doubt that MaaS will dominate the mobility landscape of the future around the globe. For both aggregators and transport operators, now is the time to lay the foundation for future economic (and at the same time ecological and social) success. Legislators should use their steering role to further promote collaboration and integration.

**Aggregators:**

**Advance current offering towards full-scale MaaS business models.** Despite the complex situation with unwilling and/or unable MaaS players to cooperate with, aggregators should nevertheless attempt to advance their offering towards full-scale MaaS. After all, the resources required are expected to be well invested, since only a comprehensive solution will allow MaaS providers to operate their business in the black.

"MaaS will play an important part in future mobility. This instrument will only be successful if all players work together."

**VÉRONIQUE STEPHAN**
**HEAD OF PASSENGER SERVICES MARKETS, SBB AG**

**Transport operators:**

**Define your own MaaS role and pursue a more collaborative and agile strategy.** Now is the time for transport operators to make bold strategic decisions and act upon them. They need to decide what role in the MaaS ecosystem they want to play and what this means for their current mode of customer interaction, fleet operations and collaboration efforts. Public transport needs to become aware of its leading role and to actively steer the development of MaaS through a more agile (i.e., shorter decision processes) and collaborative (i.e., open for partnerships) approach.

**Legislators:**

**Create incentives for collaboration and tie licence/tender awards to integration.** Legislators should actively support broad collaboration. Awarding passenger transport licences could, for example, be linked to the MaaS compatibility of the corresponding transport mode. Financial incentives (e.g., a compensation guarantee) could help counteract the economic risk for private providers in underdeveloped MaaS systems and break the vicious circle between low performance and low passenger numbers.

## 4. ESTABLISH THE LEGAL BASE FOR SUCCESSFUL COOPERATION AND INTEGRATION

Open cooperation across all MaaS players und comprehensive integration of relevant mobility systems can only work if the right legal base has been established. Here, legislators need to fulfil their role and create a regulative base that pays justice to MaaS in all respects (e.g., data processing, operational liability, and passenger rights). All other MaaS players should collaboratively support this necessary legislative process.

"It's important to pursue a balanced approach to regulation: serving the public interest while allowing private actors to innovate."

**PROF. ANDREAS HERRMANN**
**DIRECTOR, INSTITUTE FOR MOBILITY AT HSG**

**Legislators:**

**Put legally secure yet implementable data regulations in place.** The discussion at the roundtable highlighted the great uncertainty of all MaaS players in terms of data processing. Legislators need to address this uncertainty by adapting existing data protection laws, so that they are legally sound and at the same time pragmatically applicable.

**Lay foundation for collaboration by fully incorporating MaaS** (e.g., tax, passenger rights). Another need for action for legislators lies in developing a comprehensive legal framework for the entire MaaS ecosystem, covering both supply and demand. Supply-wise, a comprehensive legal base must be established (e.g., for tax schemes) that not only enables but ideally even promotes collaboration between different MaaS players. Demand-wise, clarity on the subject of passenger rights (among other things) must exist for MaaS aggregators to make service guarantees to consumers with a clear conscience.

**All other players:**

**Support legislators in creating legal base through collaborative efforts.** Close cooperation between legislators and all other MaaS players is essential in the context of lawmaking. Enablers such as IT and ICT providers should share their insights from daily data processing and their experience with different system interfaces. Aggregators and operators of transportation modes should share their consumers' perspectives on topics such as data privacy and customer experience.

# Conclusion

All participants of the first Future of Mobility Roundtable at the St. Gallen Symposium agreed that **MaaS has the potential to fix the flaws in our current transportation systems,** contributing to the fight against climate change and delivering (additional) ecological, social and economic benefits. The urgent need for innovative mobility services is confronted with the **following four pain points,** however, which can only be tackled by acting collaboratively:

1. **TO BREAK UP MOBILITY PATTERNS, USERS MUST BE CONVINCED OF THE BENEFITS OF MAAS VIA SUCCESSFUL SHOWCASES AS WELL AS "CARROTS AND STICKS".**
2. **FOR NEXT-LEVEL MAAS, ALL PLAYERS NEED TO TECHNICALLY OPEN UP TO INTEGRATING OPERATIONS AS WELL AS PRICING AND PAYMENT SYSTEMS.**
3. **TO OVERCOME THE LACKING AGILITY AND STRATEGIC MOMENTUM, NOW IS THE TIME FOR PLAYERS TO DEFINE THEIR MAAS STRATEGY AND ACT UPON IT.**
4. **TO REMOVE CURRENT HURDLES IN IMPLEMENTATION, A SOUND AND PRAMATIC LEGAL FRAMEWORK FOR MAAS MUST BE ESTABLISHED.**

As all four recommended actions imply, **only collaboration across all MaaS players can lead to success.** Above all, it is the legislators, namely cities, that have a prominent role: **Cities must orchestrate all MaaS players** by (a) bringing all relevant stakeholders to the table, (b) incentivising both supply (i.e., MaaS players) and demand (i.e., consumers) to participate, (c) regulating MaaS with a clear view of the benefits for its citizens, and (d) experimenting with new mobility solutions while finding the right balance between regulation and encouragement. For the latter, innovation-driven and pragmatic pilot projects are needed. As indicated, the **success of MaaS depends largely on convincing showcases in which consumers can benefit from MaaS first-hand.** This joint success of all MaaS players is often even easier to achieve in smaller cities than in large complex mobility systems. After all, it is these success stories that can and will lay the groundwork for a future with collaborative Mobility as a Service.

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