Mobility as a Service: Implications for future mainstream public transport

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ABSTRACT

Bundled offerings that facilitate using multiple means for solving everyday travel needs are proposed to hold potential to facilitate a modal shift from private cars to servitized transport modes, including public transport (PT). However, this type of offering, often coined Mobility as a Service (MaaS), may require new forms of partnerships, in which private actors play a larger role in the creation of public value. Accordingly, based on input from 19 interviews with MaaS actors in West Sweden, this paper explores how MaaS could develop and how future mainstream PT might be affected. Three predictive scenarios are identified – market-driven, public-controlled and public-private – and the impact on PT, in terms of the scope, usage, access, business model, competence structure and brand value, are discussed in relation to these. The paper also illustrates that the development of MaaS in Sweden seems to take the public-private route. Lastly, the authors conclude that finding a regulatory ‘sweet spot’ that drives innovation and secures public benefits will be key for future development.

1. Introduction

Tighter economic circumstances as well as shifting norms and attitudes towards transport are changing how we travel. For example, millennials thus far own fewer cars, drive less, and are less likely to be licensed drivers, compared to the generations that preceded them (Klein & Smart, 2017). Global trends such as digitalization and servitization are concurrently opening novel opportunities for new types of personal transport services. The ride-hailing service Uber was for instance, seven years after its launch, present in 500+ cities with more than 40 million monthly users (Kokalitcheva, 2016). This growth has come at the cost of the incumbent taxi industry (Cowley, 2017), which has labeled the new competitor as unsafe and rapacious (Rogers, 2015), but it has also been associated with a decline in consumer complaints per taxi trip, as taxis have responded to the new competition by improving service quality (Wallsten, 2015). Hence, one might argue that such disrupting developments push the personal transport sector to better meet emerging user needs.
It is suggested that both novel personal transport services, and more established service models such as taxis and rental cars, can complement public transport (PT) (e.g. Murphy, 2016). Based on these ideas, bundled offerings that facilitate the usage of multiple means for solving everyday travel needs are proposed to hold potential to attract users, at the expense of private car usage (e.g. Burrows, 2016; Kerttu, Smidfelt Rosqvist, & Wendle, 2017; UITP, 2016). This type of offering is often coined Mobility as a Service (MaaS).

Häikkilä’s master’s thesis, ‘Mobility as a Service – A Proposal for Action for the Public Administration’ (2014), helped popularize the notion of MaaS, and it was further spread internationally during the 10th ITS European Conference in Helsinki in 2014. Since then, the term has rapidly gone from nowhere to nearly everywhere in the personal transport sector. Several demonstrations of MaaS-like offerings have been performed, for example UbiGo in Gothenburg, Sweden, Smile in Vienna, Austria, Switch in Hannover, Germany and Maas Global in Helsinki, Finland (cf. Kamargianni, Li & Matyas, 2016). Many actors in the current personal transport ecosystem are now investigating their roles in the development of MaaS, for example the regional PT authority (PTA) in the Stockholm region that has decided on a strategic orientation in the matter (Palmbeck, 2016). Altogether, these initiatives have shown both potential to impact travel behavior and a far-reaching interest among relevant actors. Still, full-scale implementations reaping public benefits are lacking.

MaaS has been on the agenda in West Sweden since a Gothenburg-based pilot in 2014 successfully demonstrated how citizens might benefit from such services (Sochor, Karlsson, & Strömberg, 2016; Sochor, Strömberg, & Karlsson, 2015). The pilot, which often is described as the first demonstration in real-life conditions, yielded international recognition and spurred local action. Still, the development came to a halt, largely as the regional PTA is yet to release their tickets for resale (Smith et al., 2017), which they have been hesitant to do prior to thoroughly evaluating their legal possibilities and the potential consequences. In spring 2017 they publicly launched such a plan, as by then they had teamed up with other Swedish PTAs to develop a joint nationwide technical platform for ticket distribution in a project called ‘Swedish Mobility Program’ (SMP) (Västrafik, 2017).

The PTA’s interest in MaaS comes from their desire to find new cost-efficient ways of reaching their goal of doubling PT’s modal share. However, MaaS is not simply a new sales channel for PT tickets. It is a much more complex reform as the concept may require new forms of public-private partnerships (PPPs) in which private actors play a larger role in the creation of public value. For instance, the goal of SMP is to enable third parties to develop MaaS that include PT in their offering (Laurell, 2017). Thus, these services will become intermediaries between the PTA and the PT users. As a consequence, the approaching era of MaaS might disrupt the current role and organization of PT. Accordingly, based on input from 19 interviews with public and private MaaS actors in West Sweden, performed prior to the PTA’s decision to join SMP, this paper explores development scenarios and plausible implications for future mainstream PT.

The paper is organized as follows. First, a conceptual framework is detailed and the research approach explained. Thereafter, three potential scenarios for the development of MaaS are outlined, followed by a description of their implications for future mainstream PT as foreseen by the interviewees. Lastly, the authors provide some concluding remarks.
2. Conceptual framework

A commonly accepted definition of MaaS is yet to emerge (cf. Karlsson, 2016). However, in an early description, Hietanen (2014, p. 2) envisioned “a mobility distribution model in which a customer’s major transportation needs are met over one interface and are offered by a service provider”. Ever since, researchers have debated what is or is not MaaS. For instance, Holmberg et al. (2016) argued that the MaaS concept encompasses a wide range of transport services, from peer-to-peer services (e.g. BlaBlaCar) to services that attempt to optimize the connection between personal cars and PT (e.g. Ha:mo). In contrast, other scholars have narrowed down the scope to only include packaged offerings. For instance, assuming that a higher level of integration is more appealing to travellers, Karmargianni et al. (2016) proposed that intermodal planning, booking and payment functionalities, as well as multiple transport modes and mobility packages, are important components of MaaS schemes. Several definitions have also highlighted the focus on customization and user-centric design (e.g. König, Sochor & Eckhardt, 2016). This paper adopts a broad interpretation of MaaS as “services that facilitate using various modes of transport to get from one place to another” (cf. Laurell, 2017, p. 4), but delimits the discussion to bundled offerings that facilitate intermodal use of PT and other transport services. MaaS might lead to hassle-free, price-worthy and personalized mobility, as it is envisioned to bridge the gap between tools and services that travellers need to conduct a trip (Kamargianni & Matyas, 2017).

Kamargianni and Matyas (2017) suggested that a new player, namely the MaaS operator, has to enter the transport market in order to realize MaaS. However, shifting the perspective slightly, the authors of this paper argue that the development of MaaS rather introduces a need for two new roles in the value chain: integrators that assemble the offerings of several transport providers, and operators that package and deliver these offerings to end-users. An overview of how the transition from a detached to an integrated system changes the core roles in the value chain is provided in Figure 1 (similar models can be found in e.g. Kerttu et al., 2017; Laurell, 2017). These two new roles can either be taken on by existing players (inside or outside the current transport ecosystem) or spur new players to emerge. Moreover, there might be several integrators and operators, working either in parallel or delivering to each other, and transport providers’ current sales channels are likely to remain. In other words, MaaS can complement the current, detached model rather than replace it. Furthermore, the value chain of MaaS, from transport providers to end-users, will predictively include different types of facilitators, e.g. technology providers (König et al., 2016; Smith et al., 2017).

![Figure 1. Core roles in current (detached) and (integrated) MaaS value chains](image-url)
3. Research approach

3.1 Research setting

Upon the success of the UbiGo pilot in 2014, the regional PT committee in West Sweden commissioned the PTA’s operational PT company to proceed with MaaS through a pre-commercial procurement (Frey, 2014). The overarching aims of the procurement were to stimulate the market and to identify a private actor that could develop and deliver a MaaS that included the regional PT offering. In response to this, the operational PT company formed an internal project group with the mission to identify a cost-effective solution that both contributes to an increased modal share of PT and enhances the brand value of the operational company.

In order to better understand how to formulate the conditions for the procurement, the operational company invited potentially interested private actors to a request for information (RFI) process regarding MaaS in April 2016. Roughly 120 representatives from 65 organizations attended the start-up meeting. Thereafter, 30 potential bidders explicated their views in individual meetings with the project group. In general, the potential bidders stressed the importance of considering cross-sector collaboration, allocation of responsibilities, governance, business models, target groups, service design and technical integration (Smith et al., 2017).

3.2 Research method

Following the RFI-process, 19 semi-structured interviews were performed with involved actors. The interviewees were purposively selected to represent the different types of roles in the emerging MaaS ecosystem (cf. Figure 1). A total of ten interviewees represented private actors that strived to acquire roles as transport providers, integrators, MaaS operators or some form of facilitator. The nine interviewees from the public sector originated from the project group, the project’s steering group, the operational company’s executive group and from the department of PT and infrastructure (e.g. civil servants for the regional PT committee). The interviews followed an adaptable and flexible interview guide, covering four overarching topics: experiences in relation to MaaS, visions and goals for the development of MaaS, perceptions of the on-going development and conditions for the emergence of sustainable and viable MaaS.

The interviews were recorded, transcribed and eventually inductively coded and clustered in Atlas.TI, following the recommended process in Charmaz (2006). For the purpose of this paper, the codes that covered the topics of roles and responsibilities were first selected. Based on these codes, three scenarios for the future development were identified, which are labeled: market-driven, public-controlled and public-private development. Then, the quotes that dealt with the potential impact of the development of MaaS were added to the mix. Finally, another round of analysis, tracing the assumed impacts, and relating them to each scenario, was performed.
4. Scenarios

4.1 Market-driven development

In the first scenario, market-driven development, the mission of the PTAs is more or less unchanged. Their core assignment is still to plan, procure and evaluate mainstream PT. The only added actions they have to perform in relation to the development of MaaS are:

- To make it possible for third-party actors to resell PT tickets digitally (cf. Li & Voege, 2017)
- To modify the range of PT tickets in order to facilitate bundling with other servitized transport modes (cf. Holmberg et al., 2016)
- To offer viable and just deals for third-party resellers (e.g. MaaS operators)

Thus, the public sector’s role in the value chain would be as PT providers (through the PTA), as illustrated in Figure 2. As a result, the public control of the direction of the development of MaaS would mostly lie in the associated conditions for reselling PT tickets, and the PTAs’ only direct way to catalyze action would be to subsidize the PT tickets to attract emerging MaaS integrators and operators. In general, the public sector would act as an enabler rather than as a driving force in this scenario (cf. enabling government, e.g Gilbert & Gilbert, 1989), as private actors are expected to push the development. As a consequence, the MaaS operator and integrator roles are anticipated to either be absorbed by existing transport service providers or technology companies (inside and outside the transport sector), or attract start-ups to set up shop.

![Diagram of Market-driven development of MaaS]

**Figure 2. Market-driven development of MaaS**

An underlying assumption behind the feasibility of this scenario is that MaaS constitutes viable business opportunities for MaaS operators and integrators as well as transport service providers (given that the PTA collaborates). It is also largely based on the argument that private sector actors have higher incentives and better capabilities to develop innovative services that meet customers’ needs, compared to the public sector. Hence, unleashing the power of the market might lead to MaaS that better competes with the efficacy of the private car. Still, a well-functioning, high-capacity PT is seen as a prerequisite for the development of a viable MaaS (cf. Li & Voege, 2017). A majority of proponents of the market-driven scenario also either believe that ‘the invisible hand’ (cf. Smith, 1759) will secure social benefits or that the regulatory framework associated with the right to resell PT tickets will be enough to steer away from unwanted developments.
4.2 Public-controlled development

In contrast to the market-driven scenario, a public-controlled development of MaaS implies a significantly enlarged scope for the PTAs. In this scenario, the public sector would not only be responsible for planning, procuring and evaluating mainstream PT, but also for adopting the MaaS integrator and operator roles (see Figure 3). As such, the public sector would drive the emergence of MaaS by orchestrating and funding development, implementation as well as operation. However, it is not strictly necessary that the PTAs internally adopt the new roles, as the public sector could also drive the emergence of MaaS by procuring development, integrator or operator services from private actors (i.e. according to the current division of roles as purchaser and service providers). Furthermore, the public sector could also set up new organizations or companies over which they have direct or indirect control.

![Figure 3. Public-controlled development of MaaS](image)

The logic of this scenario rests on three underpinning arguments. First, the main purpose of the development of MaaS is to contribute to societal good through facilitating a modal shift from private cars to servitized modes (e.g. Sochor et al., 2015; Sochor et al., 2016). Second, PT is the backbone of MaaS as it is “the only superior alternative to individual private car use able to fulfill the lion’s share of trips” (UITP, 2016, p. 3). Third, public and private actors might have conflicting goals. For instance, one interviewee explained that a private MaaS operator would aim to maximize its revenue by selling as many and as expensive trips as possible. In contrast, the public sector rather strive towards reducing the amount of travel and increasing the modal share of PT, which is an inexpensive product compared to e.g. carpools and rental cars. Thus, public control is arguably needed in order to steer the development towards societal good. Moreover, some contend that the business opportunity in adopting the new roles in the MaaS ecosystem are limited or non-existent, due to small margins within the sector, large administration costs, and a lack of proof of the end-users’ willingness to pay (Smith et al., 2017). Hence, public funding might be needed to catalyze the development.

In Sweden, there might currently be substantial legal hindrances for this scenario, in particular if the PTAs are supposed to internally adopt the new roles (e.g. Västrafik, 2014). The Swedish PT act (2010:1065), the local government act (1991:900), the law on the application of EU state aid rules (2013:388) and the competition act (2008:579) may imply that PTAs, under current legal circumstances, cannot operate outside the scope of their role as provider of mainstream PT, as they for instance are prohibited to distort or limit the private market. Hence, in Sweden, the public-controlled development scenario might require either legal and/or policy changes, or the introduction of new public sector actors.
4.3 Public-private development

The third scenario, public-private development, can be interpreted as the middle way between the market-driven development and public-controlled development scenarios. It implies that the public sector enlarges its scope in the personal transport service value chain by absorbing the MaaS integrator role. Moreover, the MaaS operator role remains open for both public and private actors to adopt (see Figure 4). Thus, this scenario implies that both sectors take active, front seat roles in the development of MaaS.

![Figure 4. Public-private development of MaaS](image)

Similar to the market-driven scenario, the feasibility of the public-private development scenario is based on the idea of the public sector enabling the private sector. However, in this scenario, the public sector contributes to the development by taking on the integrator role (in addition to the actions described in the market-driven scenario), which proponents argue will result in a lower initial investment cost for MaaS operators, as they will not have to develop an integration platform. Another potential benefit of this scenario that proponents foresee is that a publicly controlled integrator could act as a ‘neutral buffer’ between MaaS operators and transport providers, thus, mitigating the risks of MaaS operators becoming too dominant. For instance, one interviewee, that represented a private transport provider, described it as a potential measure for avoiding a development similar to what the rental car industry has undergone. He believed that the car rental companies have become too dependent on brokers, and that the brokers used their positions to negotiate unjust deals.

Currently, several initiatives in Sweden point towards a public-private development scenario. First, Stockholm’s regional PTA has released a MaaS strategy that, among other things, points out that they will solely act as a PT provider in a future MaaS ecosystem, and support national PT cooperation through a national integrator in competition with other integrators (i.e. both public and private integrators will exist) (Palmbeck, 2016). Second, the regional PTA in West Sweden has together with other Swedish PTAs teamed up to develop a joint, nationwide technical platform for ticket distribution (Västrafik, 2017). This initiative implies that Samtrafiken, a public company that aims to support coordination of PT in Sweden, will adopt the integrator role (Laurell, 2017). Third, the Swedish government has launched a collaboration program to accelerate findings of innovative solutions that address major societal challenges (Näringsdepartementet, 2016). One of the included initiatives aims to coordinate, stimulate and monitor the implementation of a national action plan for MaaS in Sweden (Näringsdepartementet, 2017). This action plan pinpoints the coordination (and harmonization) of regulated, third-party access to PT tickets as a prioritized measure.
5. Implications for future mainstream PT

The interviewees anticipated a wide range of implications for future mainstream PT from the development of MaaS. These are portrayed below and discussed in relation to the three development scenarios described above.

5.1 Scope

Multiple future outlooks for the personal transport system have predicted that the boundaries between mobility modes will break down. For instance, Atkins (2016, p. 30) wrote that “transport modes (i.e. bus, train, tram, taxi) will become more blurred as hybrid services develop that cross the distinctions between them”. The interviewees pointed out that the adoption of MaaS might fuel this transition, as combined offerings hold potential to tear down the distinction between the included modes. This also implies that the lines between public and private transport services might become more difficult to interpret, and that the scope of PT and PTAs will change. For PTAs, their role in MaaS is largely dependent on the development scenario, as discussed in Section 4.

Two distinct trains of thought were identified among the interviewees regarding the scope of the PTAs. Proponents of the market-driven scenario commonly urged for a proactive yet backseat role as a PT provider – mainly opening PT tickets for resale, and inviting private actors to take part in dialogues on how these can be adjusted to enhance opportunities to create MaaS offerings that meet citizens’ needs. Hence, this might imply a slightly reduced scope of PTAs in the delivery of PT (e.g. less involvement in the interaction with users) and increased collaboration with, and dependency on, private actors. In contrast, proponents of the public-controlled scenario typically argued that the market-driven scenario would steer the development of MaaS towards business optimization rather than societal good. Therefore, they proposed that the PTAs should take control by absorbing the MaaS integrator and operator roles, which would substantially enlarge the scope of the PTAs. However, several interviewees stressed that neither the PTA, nor other transport providers, may be suitable for the MaaS operator role, as both actor types would have incentives to favor usage of their own transport services.

The role of mainstream PT in transporting people might, however, be more path-independent (compared to the role of the PTAs). There seems to be a common conception among the interviewees that PT will be the core of MaaS, no matter what. Like Tsay and Accuardi (2016), they believed that MaaS will not replace high-quality, fixed-route transit as the most efficient means of moving people along dense urban corridors.

“No matter how you piece different mobility modes together, public transport will always be the big part, definitely not the only part, but it will be the big part of many people’s travelling”. – IP15 (translated)

Still, a subset of the interviewees argued that the scope of future mainstream PT might be reduced due to the larger role of other transport services. They argued that the mission of mainstream PT arguably would be to provide the high-capacity backbone, while other transport modes might serve less populated areas and more complex routes or citizen needs to a greater extent. However, other interviewees pointed out that public sector intervention
might be required to steer private transport services towards complementary markets. If profitable, for-profit companies would already be serving such markets, which they are not, they argued. Hence, regulations and subsidies might be required for the development of MaaS that takes advantage of the included services’ particular strengths, and avoids their weaknesses (cf. Van Nes, 2002).

### 5.2 Usage

As MaaS is expected to improve the possibilities of using multiple transport services for fulfilling the full range of mobility needs, most interviewees believed that motivations for both car ownership and use will be impeded. As a consequence, a scenario where urban and suburban households abandon their second car initially, and eventually also their first car, was frequently mentioned during the interviews. This would mean that the economic and habitual lock-in effects of car ownership would be reduced, i.e. the positive feedback loop between car ownership and usage would be broken (e.g. Yang, Liu, Qin & Linn, 2016). Additionally, MaaS can lower entry barriers, facilitating experimenting and creating new mental models in favor of servitized modes (cf. Strömberg, 2015).

“I’m now registered at car2go and when I’m somewhere in the city, already my mindset has changed since then, if I know there’s car2go, I always consider that in my mind in addition to other options. If I wouldn’t have been registered to car2go, I also wouldn’t do that”. – IP6

However, both major structural and cultural concepts have precluded socio-technical transitions that threaten car dependency, and the automotive industry has previously exhibited profound regime stability (Wells & Nieuwenhuis, 2012). Still, the majority of the interviewees believed that the adoption of MaaS would result in a modal shift towards increased usage of all servitized transport modes, at the expense of private car usage. Accordingly, most interviewees also foresaw an increased usage of mainstream PT.

“First of all when you lower the barriers to use public transport or to use mobility, it will help to reduce the ownership of cars, right? So they will say they will be less dependent [on] their car and they will be encouraged more to use the public transport”. – IP16

However, the increase in PT usage might be path-dependent. Holmberg et al. (2016) argued that a public-controlled scenario implies that MaaS would be designed to maximize use of mainstream PT (rather than maximizing the service satisfaction of the customers). Looking at a comparable scenario, Kerttu et al. (2017) stated that MaaS would be developed, implemented and marketed to the extent that it contributes to achieving goals to increase PT usage and cost coverage rates. In contrast, some interviewees feared that a market-driven scenario would lead to cannibalization of the current PT share, partly since current PT users will likely gain easier access to car-based services, and partly as it might be more profitable for a MaaS operator to sell more expensive (car-based) services, such as carsharing or taxi, compared to PT. Unintended or rebound effects, such as increasing the number of journeys in total or leading to a shift away from PT, have similarly been identified as a significant risk in extant reports (e.g. Datson, 2016; Karlsson et al., 2017).
5.3 Access
Holmberg et al. (2016) argued that the major upside of having the PTAs in front seat roles would be longitudinal stability (guaranteeing service existence over time) for MaaS, and lateral coverage (guaranteeing service existence geographically). Similarly, the interviewees foresaw that public-controlled MaaS might lead to increased PT access in less populated areas, basically as the integration would facilitate other transport services to function as feeder services to PT, thus enlarging its reach. However, many interviewees believed that this effect moreover also would hold true in a market-driven scenario (assuming effective regulations). Furthermore, such a scenario could additionally improve access to PT in other ways; as other actors would be able to include PT in their offerings, more gateways to using PT as well as a broader flora of MaaS offerings (including PT) might develop, they argued.

“You get access to other parts of the transport system, which makes it easier for you to see that: If I do this, I can just take a taxi there, and then I’ll take that and then I’ll use that. So, it becomes an, an increased accessibility to the opportunity to travel”. – IP1 (translated)

Moreover, due to the perceived superior flexibility of privately operated transport services, MaaS proponents have suggested that MaaS might create opportunities for more flexible planning of PT (e.g. Tsay & Accuardi, 2016). Some interviewees believed that this would foster opportunities to improve service quality in inefficient transit markets, i.e. to enlarge the access to PT.

5.4 Business model
Based on the superior flexibility argument, most interviewees anticipated that MaaS would contribute to increasing cost-efficiency of public spending in providing mainstream PT access to citizens. This is moreover the major underlying reason as to why the regional PTA in West Sweden is interested in MaaS, i.e. to be able to achieve more with a similar budget through smart cooperation with the private sector (cf. Bokeberg, Persson & Efraimsson, 2016).

“We need to make [MaaS] happen in order to narrow down the social funding to high-capacity [PT], and then find the business model with the private [sector] to still reach out and become even more attractive”. – IP13 (translated)

Drawing on the access argument above, several interviewees also stated that, in essence, the potential customer base for mainstream PT could become larger if MaaS were introduced. Thus, many interviewees believed that the development of MaaS offers PTAs an opportunity to find new customers and increase revenue1. Moreover, extant reports note that MaaS can increase the perceived value of mainstream PT services (e.g. Van Audenhove, Korniichuk, Dauby, & Pourbaix, 2014), thus potentially increasing willingness to pay.

“In symbiosis with other actors, [the PTA] should become a more important means of communication. So more passengers, that’s the outcome”. – IP3 (translated)

1 However increased mainstream PT ridership also means increased public costs, as a portion of the PT ticket prices is subsidized by the public sector, at least in Sweden (assuming no changes in the subsidy model).
In contrast, other interviewees feared that a market-driven scenario might erode PTAs’ business models and create an unjust transport system. They feared that other transport services would cannibalize on the current PT modal share and/or only target profitable markets. Thus, this might leave the PTAs with less capabilities and funds to carry out mainstream PT services.

A public-controlled scenario would, however, also open opportunities for the PTAs to extract significant value. They could aggregate and offer services to the customer from private transport providers, “thereby strengthening the profile of PT as the backbone of urban mobility while simultaneously generating additional revenue” (Van Audenhove et al., 2014, p. 48).

5.5 Competence structure
The development of MaaS is bound to impact the competence requirements of and the competence generation within the PTAs. For instance, all three scenarios imply that the PTAs collaborate in new ways with private actors to generate public value. Hence, new organizational models, processes and competences supporting inter-organizational collaboration will be needed. Moreover, the public-controlled scenario implies that the PTAs should enlarge their scope significantly, and take on new roles. This would put additional demands on their organizations.

Future outlooks for MaaS development have widely recognized that MaaS might have the potential to supply PTAs with richer and more holistic data on end-users’ travel behaviors (e.g. Datson, 2016). As MaaS users are expected to perform a majority of their planning and purchasing of personal transport services through a joint digital app, such apps could be used to e.g. gather information on their service needs and to nudge their travel behaviors.

It’s not only [that] the commuters have a better access to [the] mobility service, mobility provider[s] have nowadays better access to their user group – IP16

However, the market-driven model implies that PTAs will be less involved in the interaction with PT end-users. For instance, they might choose to plan their travel and purchase their tickets through third-party MaaS. Hence, some interviewees stressed the importance of inter-organizational data sharing as especially important in this scenario.

There must be openness - that you share data and statistics among each other. Otherwise, it will not, it will be very difficult to plan and dimension and to set a budget – IP4 (translated)

5.6 Brand value
Lastly, the interviewees foresaw several implications for the PTAs’ brands from the development of MaaS. First, some emphasized that MaaS holds potential to improve the general perception of the PT brands, if the development manages to transform the general view of mainstream PT from an isolated and old-fashioned service, to a part of a contemporary transport model.
I also believe that we gain from it, like, that we do something new, like from a brand perspective, that we actually develop our services, that we gain from it brand-wise – IP11 (translated)

However, MaaS could also lead to the PTAs having less control over their brands. For instance, in a market-driven scenario, the PTAs would not be in charge of the MaaS. In none of the scenarios would they be able to control the deliverance of other types of transport; hence, it will be difficult for them to guarantee the quality of the services that PT is associated with. Moreover, the development of MaaS might also lead to less exposure of the PT brands if the MaaS operators’ brands are highlighted at the expense of the PT brands. For instance, Arbib and Serba (2017) argued that MaaS operators will be the new transportation brands, drawing on the development in internet and social media contexts, where users’ primary relationships are with Facebook, Google or Amazon, not with the computer manufacturers or the networking companies which power their data centers. Many interviewees believed that this prediction especially holds true in the market-driven scenario.

6. Concluding remarks
This paper explores how MaaS could develop, focusing on the interplay between the public and private sectors. Based on interviews with MaaS actors, three distinct scenarios are identified for MaaS: market-driven, public-controlled and public-private. A majority of the interviewees believed that all three scenarios will likely have a large impact on future mainstream PT, but their views of the consequences differed. According to the interviewees, a market-driven development could either increase the efficacy of and access to PT, or ultimately erode the PTAs’ business models and create an unjust transport system. A public-controlled development could either proficiently mitigate the current divide between societal aims and business goals, or create a system that is neither attractive for private actors, nor for end-users.

Currently, several national and local initiatives in Sweden point towards the middle way, i.e. towards the public-private scenario. This scenario is based on the idea that the public sector should make use of the innovativeness of the private sector, but still keep some level of control over the direction of the development. Hence, the scenario suggests that the PTAs should enable private actors to develop MaaS, basically by making it possible and viable for third-party actors to resell PT tickets. Additionally, the public sector should adopt the integrator role to lower initial investment cost for MaaS operators, and to act as a ‘neutral buffer’ between MaaS operators and transport providers. For future mainstream PT this scenario might help to secure the role of PT as the backbone of MaaS.

The findings in this paper imply that MaaS can be developed in many different ways, for different purposes and with different impacts on mainstream PT. The interviewees' comments also highlighted the importance of appropriate inter-organizational innovation management. In general, too much regulation might impede the private sector’s ability to participate and innovate, leading to unattractive MaaS. On the other hand, too little regulation might lead to MaaS that does not serve public interest. Hence, finding the regulatory ‘sweet spot’ with appropriate regulations and incentives seems to be a key action for the public sector, in order to facilitate the development of viable and sustainable MaaS (cf. Goodall, Fishman, Bornstein & Bontrhon, 2017).
Although the purpose of the identified scenarios was to highlight the interplay between public and private actors, they do not portray the full spectrum of potential PPPs. For instance, in Seinäjoki, Finland, a private consulting company, the municipality and transport operators are planning to create a joint MaaS operator company (König, Eckhardt, Aapaoja, Sochor & Karlsson, 2016). Moreover, the paper illustrates the anticipated impacts on mainstream PT’s scope, usage, access, business model, competence structure and brand value. MaaS is however likely to have many more impacts, and in general little is known about the consequences the development will have. For instance, “providing mobility using MaaS may result in consumers deciding they no longer need to own a car. It may also have other consequences, such as increasing the number of journeys or leading to mode-shift away from PT” (Datson, 2016, p. 9). Hence, as also emphasized by Karlsson et al. (2017), further studies on the impacts of the development of MaaS are needed.

References


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