Experimentation for sustainable transport?

Risks, strengths, and governance implications

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– Chapter 9 –

Smart Mobility Experimentation

- Reflecting on a Public Transport Authority's Convoluted Journey with Mobility-as-a-Service

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Mobility-as-a-Service (MaaS) is an umbrella term for services that enable users to plan, book, and pay for multiple types of mobility services through a joint digital channel (Smith 2020). From late 2013 to early 2014, what is often referred to as the world's first MaaS pilot took place in Gothenburg, a city located in Västra Götaland, Sweden. The outcome was promising; the pilot participants appreciated the service and substituted private car use for shared and active mobility during the pilot period. Inspired by these results, the regional public transport authority (PTA) for Västra Götaland[1] has since performed a suite of experiments to further explore the MaaS concept and to facilitate its implementation. Still, seven years later, MaaS is not available in Västra Götaland, apart from via one commercial service that integrates public transport with parking, and in a few small-scale pilots.

In this chapter, I briefly describe the PTA's journey in relation to MaaS as I see it, and, with the benefit of hindsight, reflect on

1 The formal regional public transport authority for Västra Götaland is a political body called the Public Transport Committee. The committee´s main task is to conduct overall strategic work for the development of public transport in the region, which they do in close collaboration with the civil servants at the Public Transport and Infrastructure Division of Region Västra Götaland. Västtrafik AB, a company owned by Region Västra Götaland, performs the more detailed planning and procures the public transport offering, which then is delivered to the citizens by private operators. In this chapter, Region Västra Götaland, the Public Transport Committee, and Västtrafik AB are treated as one organisation and referred to as the PTA.

what I believe has hindered greater progress. The reason that I judge that I have something to say about this is that between

2016 and 2020 I was employed as an industrial doctoral student at the PTA. In this dual role as civil servant and aspiring researcher, I was specifically assigned to oversee and analyse the PTA's work on MaaS and to revise their MaaS strategy based on my insights. As I argued in my doctoral thesis from 2020, this exploratory and participatory research approach gave me a unique opportunity to acquire an empirically grounded understanding of the dynamics of MaaS developments. Still, now that some time has passed and I no longer must navigate the constraints associated with my dual role at the PTA (see Smith 2017), this chapter arguably gives me an opportunity to step back and reflect more broadly on my experiences.

Given the ground-breaking but convoluted nature of the PTA's journey with MaaS, I believe that it can be an informative case for other public authorities that set out to experiment with smart mobility concepts such as MaaS. Hence, inspired by the literature on projectification and experimentation, I end the chapter by proposing what there might be to learn for public authorities. I considered the two selected strands of literature to offer a valuable frame of reference for this analysis since the former explains how the prevailing project logic within the public sector in Western countries shapes expectations on experiments, and the latter highlights the need to move beyond a narrow focus on scaling the outcome of isolated experiments. Researchers Torrens and von Wirth (2021) have suggested that, taken together, the two strands of literature instead propose a much wider view of how experiments can be organised and through which mechanisms they can stimulate societal trans-

formations. This perspective helped me critically reflect on the PTA's strategic decisions in relation to MaaS.

THE PUBLIC TRANSPORT AUTHORITY'S JOURNEY WITH MOBILITY-AS-A-SERVICE

In 2011, an internally funded project entitled The Flexible Traveller (Swedish: *Den flexible trafikanten*) introduced the MaaS concept to the PTA. The project report suggested that MaaS services, if comprehensive, reliable, and personalised, could reduce transport costs, increase perceived transport flexibility, and contribute to more sustainable travel behaviour for family households and small companies in urban areas. This resonated with the PTA, which was on the hunt for new and cost-effective means to increase the modal share for public transport. The MaaS concept was therefore further developed in a two-phased research and development project named Go:Smart. The most acclaimed outcome of this project is arguably the six-month UbiGo pilot in Gothenburg, which showcased how a MaaS service can work in practice and indicated that the concept can attract user interest and help users substitute private car use with mobility services and active mobility (see Sochor et al. 2016).

Some of the actors involved in the Go:Smart project established a joint company to refine and commercialise the piloted service. However, the PTA considered that their involvement would violate the procurement law. Instead, the PTA identified five strategies for how to proceed with the MaaS concept: (i) taking a passive role to possibly get involved at a later stage, (ii) helping the private market develop MaaS services by opening digital interfaces for data and tickets but not intervening beyond that, (iii) initiating a pre-commercial procurement process to in-

ject money into the MaaS market, (iv) contracting a private actor strongly associated with Västtrafik via a service concession agreement, and (v) procuring a MaaS service for Västra Götaland based on the piloted MaaS model. It was concluded that the fourth strategy was best suited to delivering a cost-effective MaaS service that would contribute to increased sustainable travelling as well as an improved perception of the Västtrafik brand. Following a period of inaction during 2015, the PTA therefore initiated a so-called request for information process in spring 2016 with the goal of identifying appropriate concession agreement terms.

The interest in the request for information process was large; representatives from 65 organisations showed up at the kick-off. Nonetheless, the dialogue that ensued made it clear that neither the PTA nor the potential bidders had sufficient experience of MaaS to allow for fruitful procurement. The process was therefore cancelled. In 2017, the PTA instead chose to invest in a nationwide initiative that aimed to establish a publicly controlled intermediary data platform. The logic behind this initiative was that such a platform would lower the entry barriers for both those operating MaaS and for mobility service providers, and would thus facilitate the development of many different MaaS services. However, this initiative was discontinued as well due to lack of support from key actors. Consequently, the PTA had to amend its MaaS strategy once again. Inspired by the second strategy outlined above, its new and current tactic aims at enabling and stimulating private actors to integrate and resell digital public transport tickets as part of MaaS offerings.

The PTA's strategy pivots since the closure of the Go:Smart project can be interpreted as stepwise moves toward less hands-on involvement in the development of MaaS – from specifying

the design criteria for a single MaaS service for the entire region to enabling a plurality of externally driven MaaS services that the PTA has little control over (see Smith 2021). The changes in the PTA's strategy can, moreover, be understood as a gradual process of realising the immaturity and complexity of the MaaS concept, which led the PTA to take a few steps back – from trying to reap the benefits of MaaS immediately to focusing on exploring the potential of the concept and on learning how it can be developed and governed.

In 2018, the PTA started working on developing the digital interfaces, the processes, the internal organisation, and the generic contract needed to enable digital third-party resale of public transport tickets, and in the years following, these elements were tested through a suite of experiments, with the overarching goal of moving from short-term MaaS pilots to permanent MaaS operations. The first pilot that the PTA initiated was in collaboration with the municipal parking company in Gothenburg in 2019. Initially, the plan was merely to test the application programming interface for ticketing and the billing processes, but following a smooth collaboration with the parking company, a successful integration of public transport tickets in the local parking app, and a positive response from its users, the pilot period was first extended and then made permanent in 2021. As of November 2021, 29.121 public transport tickets had been sold through the local parking app (939 tickets per month on average), see Figure 1. This corresponds to approximately 0.02% of the PTA's ticket revenue. In a questionnaire distributed to users in September 2019 (n=105), 46% of the respondents fully agreed that the possibility to buy public transport tickets using the local parking app made it easier for them to travel by public transport more frequently (18% agreed to

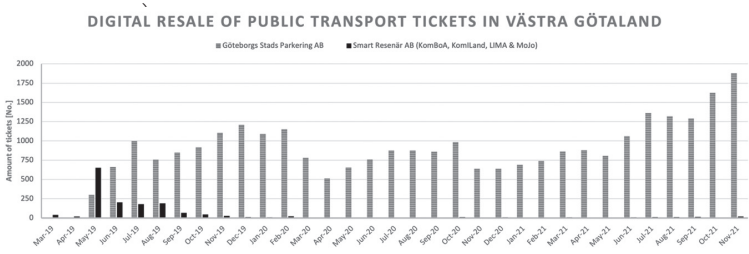

Figure 1: Digital resale of public transport tickets in Västra Götaland per month, March 2019 – November 2021.

Additionally, the PTA was involved in four MaaS pilots between 2019 and 2021 aimed at exploring potential markets for MaaS: KomBoA, which focused on MaaS for housing associations; KomILand, which focused on MaaS for rural areas, and LIMA and MoJo, which both focused on MaaS for employers. The integration of public transport tickets in the external MaaS apps piloted in these cases was carried out by the company Smart Resenär AB. As evident in Figure 1, the resale of public transport tickets was limited in all four pilots though, apart from during the first few months of the KomBoA pilot; 1.603 public transport tickets had been sold in total in November 2021 (49 per month on average). The modest ticket sales can in part be explained by the Covid-19 outbreak but also indicate that the piloted MaaS offerings and apps have not been able to compete with existing alternatives, such as private car use and existing mobility service apps, including the PTA's journey planning and ticketing app.

Overall, MaaS is still an insignificant phenomenon in Västra Götaland, with next to no impact on the daily life of citizens, and the PTA's understanding of how MaaS can contribute to an increased modal share for public transport under what con-

ditions has not developed much since the initial UbiGo pilot. The PTA's goal of moving from short-term pilots to permanent MaaS operations was, moreover, postponed on multiple occasions before the PTA finally announced that it welcomed all types of resellers in March 2022. Prior to that, only actors within the parking sector were eligible to become resellers, which is why the municipal parking company in Gothenburg, at the time of writing this chapter (March 2022) is the single reseller with a permanent contract. These results are arguably below the PTA's initial expectations. They therefore make possible a discussion on what might have hindered greater progress.

WHAT HAS HINDERED GREATER PROGRESS?

Yet, prior to scrutinising the lack of progress in this case, it is important to note that MaaS developments have not met expectations elsewhere either. Public authorities across the globe are finding MaaS difficult to realise in practice, and the concept´s proposed user appeal and ability to change modal choice is yet to be proved. Nonetheless, given that MaaS has been a prioritised topic for the PTA for seven years, the limited tangible results warrant a discussion on what might have hindered greater progress. Next, I will discuss five strategic dimensions that I believe have shaped the PTA's suite of experimental MaaS activities and influenced the outcome negatively: time and place; vision and ambition; collaboration and partners; objective and focus; and internal organisation.

Time and place

MaaS is a concept in its nascency, and it was even more so back in 2014. With a few exemptions, such as in Helsinki and Berlin,

public authorities are not yet involved in permanent MaaS operations. Hence, the PTA has had little previous MaaS experience to lean on when setting out on their MaaS journey. This has made it difficult to address questions such as: What roles are regional public transport authorities legally allowed to take in the delivery of MaaS?; What is a fair business deal with external MaaS operators?; and What might MaaS lead to in the long run? The PTA has, in other words, acted as a front-runner in relation to MaaS developments, which has resulted in them facing challenges and uncertainties that followers do not have to deal with to the same extent. People inside and outside the PTA have on many occasions questioned whether this forward-leaning position is appropriate for the PTA. Still, it is backed up by the regional development strategy for Västra Götaland. In addition to making sustainable travelling the norm, the PTA's overarching strategy goal is to ensure that Västra Götaland sets an example in the transition to a sustainable and competitive society.

It has also frequently been questioned whether Västra Götaland is appropriate for MaaS developments. Västra Götaland is in large parts sparsely populated, and Gothenburg, the largest city in the region, is with its 580,000 inhabitants quite small from a global perspective. Neither parking and congestion problems, nor the supply of mobility services in Västra Götaland is comparable with the situation in metropolitan regions. At least in theory, this makes it more difficult to compile a MaaS offering that is on a par with, or outperforms, the convenience of private car ownership, especially given that many mobility service providers lack the digital capabilities required to participate in MaaS. On the other side of the coin, Västra Götaland has a comprehensive public transport network and the penetration rates for internet access and smartphones are high – conditions

that have been pinpointed as fundamental for MaaS adoption. Yet both the early timing of and the peripheral geographical setting for the PTA's engagement with MaaS have probably influenced the ease and speed of development negatively.

Vision and ambition

The MaaS concept is surrounded by catchphrases such as 'the biggest transport revolution of the 21st century', 'the end of car ownership', and 'a new ambition for public transport'. Although persuasive for visionaries and investors, such rhetoric can be scary for organisations prone to minimising risk, like public authorities (see also chapter 2 by Berglund-Snodgrass). In the case of the PTA, MaaS' proposed capacity to revolutionise public transport has led them to think twice before enabling such developments. In particularly, this influenced their decision to postpone the launch of their digital third-party resale function, despite regional politicians (i.e. the Public Transport Committee) ordering them to make it happen.

To manage the perceived risks of MaaS, the PTA's strategy has since 2018, in practice, been to proceed step-by-step via small-scale experiments. Benefits of this incremental approach include that it requires little adjustment to the organisation's overall strategy and that it caters for a multitude of complementary experiences where each experiment carries relatively low risk. However, in contrast to high-profile demonstrations, small-scale experiments generate neither awareness among citizens, nor attention among influential stakeholders. Thus, such experiments do not build up pressure to succeed; the organisation does not invest much of its reputation in the piloted concept. In the case of the PTA, the undertaken MaaS experiments can be compared with the 2015 – 2020 large-scale demonstra-

tion of electric buses in Gothenburg (ElectriCity, electricity-goteborg.se), which paved the way for the introduction of the largest fleet of electric buses in the Nordics in Gothenburg.

Collaboration and partners

Continuing the comparison with the ElectriCity demonstration, which among others was co-sponsored by the City of Gothenburg, Volvo AB, and Ericsson AB – three of the largest employers in Västra Götaland – the PTA's key MaaS partners have, beyond academic institutions and funders, been Smart Resenär AB, EC2B AB, and UbiGo AB – three start-up organisations with fewer than ten employees in total. Start-ups are arguably often more swift-footed than large organisations but are in most cases less influential and do not have as deep pockets. MaaS is situated in a low-margin industry, requires system-level changes as well as the involvement of many actors, and competes with well-established services and well-known brands. Hence, champions of the concept in key positions across public and private sectors, as well as long-term investment might be needed for MaaS to thrive. In the case discussed in this chapter, the top politicians, civil servants, and managers at the PTA have been vocal proponents of MaaS experimentation. This, I believe, has been essential for keeping MaaS on the agenda, despite the lack of tangible success.

Although some market reports predict that the market size for MaaS will head north of $40 billion by 2030, the private sector has thus far shown lukewarm interest in investing in MaaS experimentation. The PTA's decision to enable third-party resale in 2018 was in large part motivated by the belief that this would be the quickest path to gaining insights on what effects different types of MaaS services can have under different cir-

cumstances. Regardless of what role one believes that the PTA should take in the use phase of the MaaS innovation process (cf. Smith 2020), one can discuss whether an initial do-it-yourself-approach could have generated more tangible results and thus better chances for learning about MaaS. However, such an approach would have required the PTA to invest (even) more in MaaS experimentation. It would also have required the PTA to be comfortable with entering a legal grey area.

Objective and focus

The PTA has focused on adhering to their current rule book, as interpreted by their legal consultants. This might have saved them from legal processes and bad press. Still, it has also barred them from integrating other mobility services into their journey planning and ticketing app for public transport, and thus from easily leveraging their existing public transport user base for MaaS experimentation. More generally, the choice to not challenge laws and regulations has limited the PTA's action space in relation to MaaS. The MaaS pilots that the PTA has been involved in have, moreover, all invested heavily in technology development – trying to make application programming interfaces, administrative systems, data exchanges, and user interfaces work flawlessly. I wonder whether such a technology-centric focus is the most cost-effective approach to gather the user insights needed to learn about MaaS and about the governance of MaaS developments.

As mentioned earlier in this chapter, my interpretation is that between 2016 and 2018 the PTA pivoted their MaaS strategy to focus more on learning and less on reaping immediate results. The employment of me as an industrial doctoral student is also a testament to that learning objective, I believe. Nonethe-

less, the decision to invest in MaaS experimentation despite not knowing what MaaS can lead to, and for what cost, was still constantly questioned internally during my time at the PTA. MaaS developments were compared with other, less radical but more pressing and better-defined improvement areas, and then often not prioritised in the short-term despite being at the top of the long-term strategy. Basically, despite the outspoken learning objective, MaaS was in practice often valued and prioritised based on its merits in contributing to short- and medium-term performance indicators.

Internal organisation

Overall, my experience from the PTA is that MaaS was a prioritised issue among high-level decision-makers and among the people assigned to work with MaaS developments but not in the organisational layers in-between. MaaS was described as a key strategy in steering documents and in external communication, but the internal status was for the most part low, which was reflected in the staffing, budgeting, and priority of MaaS projects. Many of the people involved with MaaS at the PTA have described their work as a constant battle to defend their line of work to colleagues – an experience that people working with MaaS at other Swedish public transport authorities share.

I appreciate the inertia of large organisations, and also that the MaaS turn is not an easy transformation for any public authority. Yet I have two observations regarding the internal MaaS organisation at the PTA. Firstly, two conflicting institutional logics – market and bureaucratic logics – seemed to be at play at the PTA, which made it difficult to agree on priorities in relation to MaaS across different divisions and departments. People involved with visions, longer-term strategies, and R&D work at

the PTA (such as me) generally appreciated the MaaS experimentation. In contrast, people focused on daily public transport operations and continuous improvement work often saw is as a waste of time and money. A clearer strategy on how to prioritize incremental versus radical innovation needs could perhaps have made it easier to reach consensus. Secondly, I believe that the PTA's choice to run the MaaS programme as an R&D project instead of embedding it in the continuous improvement work might have made it much easier to launch MaaS experiments but also made it more difficult to institutionalise the outcomes of the experiments and to stimulate broader, persistent transformations across the organisation.

WHAT IS THERE TO LEARN FOR OTHER PUBLIC AUTHORITIES?

The most straightforward, but not very encouraging, take-away from this case is that experimentation with smart mobility concepts is not an easy task for public authorities. In theory, it seems easy to design, execute, and evaluate smart mobility experiments. As an example, a policy brief on urban mobility pilots written by Zipper (2020) states that "The critical element of a successful urban mobility pilot is the development and articulation of hypotheses that the public sector will test with data, often with assistance from an external group" (p. 1). As illustrated by the PTA's convoluted journey with MaaS, the situation is often messier than that in practice though, with conflicting objectives, interests, logics, and discourses to balance, internally as well as between partners – which has also been discussed by Fred (2020) and Stål et al. (2022).

Is the main goal of an experiment to learn about potential

paths forward or is it to facilitate market introduction? According to the Swedish Innovation Agency, which has funded most of the MaaS pilots in Västra Götaland, both goals should be achieved simultaneously. However, my interpretation is that the expectations of MaaS propelled by the success of the UbiGo pilot pressured the PTA to focus on market introduction, which in turn, made them overly concerned with technical and business development to the expense of user studies and user involvement. As a result, the PTA has learned a lot about how to integrate with other actors' technical interfaces and what to put into MaaS contracts, which has ultimately enabled them to make its tickets available for third-party resale, but has made little progress in terms of reducing the uncertainty about adoption, use patterns, and behaviour change, which has hampered their decision-making and continues to surround the MaaS concept in general (see also Mladenović & Haavisto 2021).

Had I known what I know today in 2014, I would have recommended the PTA to follow-up the initial UbiGo pilot with investing in more MaaS experiments enabled by simple service prototypes to explore longer-term use patterns as well as the appeal of other variants of MaaS. Here, it is important to note that such experiments do not have to conform to a standard pilot project process; there are many other, less stringent, types of processes, such as grassroots initiatives, that can teach us about smart mobility concepts as well (see Torrens & von Wirth 2021). I would, moreover, have encouraged the PTA to formulate and communicate more precisely defined learning objectives to avoid misunderstandings about intentions across partners and to minimise the risk that the success of the experiments would be evaluated against performance indicators centred on the short-term merit of MaaS.

Turning back to the market introduction objective, this case study highlights that it can be difficult to agree on how to proceed after a collaborative experiment, regardless of its success. The people involved with MaaS at the PTA have been criticised, externally, for putting a wet blanket on the MaaS innovation process when ending pilots, and internally, for being unreliable and acting inappropriately when extending pilots. Here, I believe that new types of hybrid structures and processes that bridge the gap between time-limited experiments and permanent operations are needed. Regarding processes, pre-commercial procurement is an approach that could be further explored. In terms or structure, the PTA has established a hybrid organisation, the Innovation Arena, that is tasked with supporting internal development activities and with facilitating continuous cross-project and cross-organisational learning. To avoid the detachment of experimental activities, and thus limited potential for persistent impact, it is important to embed such hybrid spaces in the line organisation, I believe. Matching structures and processes with innovation opportunities does not make the organisation innovative on its own though. As discussed by Thomke (2020), complimentary measures that build a culture of experimentation and learning across the organisation are needed as well.

Finally, the PTA's decision to stay within the boundaries of what their legal consultants interpreted that the legislative framework allowed them to do can be questioned. The laws and regulations that influence the action space of regional public transport authorities were written long before the introduction of apps for public transport ticketing, the influx of electric scooters, and the Covid-19 pandemic. Consequently, they are not yet adjusted for smart mobility concepts, such as MaaS. Ex-

perimental activities should arguably not be limited to what is easily achievable (Torrens & von Wirth 2021). Hence, I would recommend public authorities that want to engage with smart mobility experiments, to explore, at an early stage, their legal action space and identify ways to extend it if they find that it blocks the innovation pathway deemed most appropriate for achieving sustainable and just transport systems. One approach for doing that, which has been applied to other types of mobility transformations (see Burden et al 2021), is to set up a policy lab that analyses concrete cases of conflict in collaboration with involved and affected stakeholders.

Based on the PTA's experience with MaaS, fruitful smart mobility experimentation seems to require a visionary long-term strategy that looks beyond the current legal framework but still has intermediate goals that are aligned with the maturity of the concept and thus address the issues that hinder further decision-making. Furthermore, strong leadership and determination at multiple organisational levels, an institutional environment that favours experimentation and offers hybrid spaces for cross-experiment reflection, influential and capable partners to collaborate with, and a shared understanding of how and when to measure success, all seem to increase the likelihood of transformational effects.

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THE climate crisis, together with other urgent sustainability questions, emphasises the need for a fast and pervasive change within the transport sector. During the last few years, different kinds of experimental initiatives, and the possible role these can play in climate and sustainability transformations, have become a staple of research and policy development contexts. At the same time, questions remain unanswered regarding the strengths and limitations of experimentation, and how experimentation can support transformative change.

This anthology brings together insights and reflections from research and policy practice regarding experimentation for sustainable transport. It includes eight individual chapters focusing on themes such as risk-taking, the key features of innovation-producing environments, possible synergies and conflicting interests between actors involved in experimentation, as well as issues related to design-led approaches, public involvement, legitimacy and the possibilities and constraints related to different governance rationales.

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