



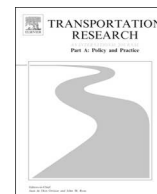
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Intermediary MaaS Integrators: A case study on hopes and fears

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ABSTRACT

At present, many policymakers and practitioners are searching for actions that could facilitate Mobility as a Service (MaaS) developments. A potential action, which has received a lot of attention, is to introduce Intermediary MaaS Integrators; that is intermediate actors that assemble the offerings from Transport Service Providers (TSPs) and distribute these to MaaS Operators. However, little is known about if and how TSPs and MaaS Operators would appreciate the introduction of Intermediary MaaS Integrators. To address this knowledge gap, this paper explores an attempt to establish a national Intermediary MaaS Integrator in Sweden. The contribution to transportation research is twofold. Firstly, the paper advances the conceptual understanding of Intermediary MaaS Integrators by identifying four defining dimensions: Activities, Management, Processes and Context. Secondly, it deepens the knowledge of Intermediary MaaS Integrators' value propositions by detailing TSPs' and prospective MaaS Operators' hopes and fears vis-à-vis them. Lastly, practical implications for how to facilitate acceptance and adoption are proposed. Intermediary MaaS Integrators should only be introduced if basic incentives for using their services are in place, and if introduced, they should preferably: go beyond offering technical services; have clear, declared objectives; be impartial and capable actors; and carefully consider their launch strategies.

1. Introduction

Mobility as a Service (MaaS) has been described an integrative concept that bundles different transport modalities into joint, seamless service offerings, as a means of providing tailored mobility solutions that cater for users' travel needs (Heikkilä, 2014; Hietanen, 2014; Mukhtar-Landgren et al., 2016). A pilot of the concept in 2013–2014 was reported to increase the modal share of public transport and other forms of shared and active transport among the participants, at the expense of private car usage (Sochor et al., 2016). Despite limited empirical evidence beyond from this pilot, both researchers and practitioners have in recent years frequently argued that the diffusion of MaaS can contribute to societally beneficial adjustments to the transportation system. Generally, the hope is that “by providing tailored solutions to individual users according to their needs and those of the system as a whole, MaaS enables not only more efficient usage of transport infrastructure, but also a better customer experience” (Veerapanane et al., 2018, p. 1). Suggested beneficial effects include a smaller carbon footprint from personal transport (e.g. Kerttu et al., 2017) and reduced congestion and need for parking (e.g. Falconer et al., 2018), which in turn could lead to higher productivity, better air

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quality and fewer traffic accidents (Goodall et al., 2017). Proponents also argue that MaaS could improve the accessibility of the transport system (Polis, 2017) and bring new opportunities for economic growth (MaaS Alliance, 2017).

Still, thus far, the cases of MaaS are few as well as limited in terms of numbers of users. It has been debated that this is due to innovation barriers hindering MaaS developments (e.g. Jittrapirom et al., 2017; Li and Voege, 2017). Such barriers have been identified on three levels: macro-, micro-, and meso-level (cf. the IRIMS framework outlined in Karlsson et al., 2017; Mukhtar-Landgren et al., 2016). On the macro-level, current legislation is perceived to make it difficult for Public Transport Authorities (PTAs) to participate in MaaS (Mukhtar-Landgren and Smith, 2019; Smith et al., 2019), which is likely fatal for MaaS developments, as public transport has been identified as the backbone of MaaS (MaaS Alliance, 2017; UITP, 2016). Existing transport policies also favor prevailing travel habits and thus hamper MaaS adoption (Holmberg et al., 2016; Li and Voege, 2017; Sochor et al., 2015). On the micro-level, the current ‘system of automobility’ (cf. Urry, 2004) is a major challenge for the diffusion of MaaS (Mulley, 2017; Pöllänen et al., 2017). Beyond often being the most time-efficient and convenient way of solving individuals’ transport needs (e.g. Gardner and Abraham, 2007), the privately owned car is also widely associated with more abstract but persuasive qualities, such as independence, identity and status (e.g. Hagman, 2003). Notwithstanding the macro- and micro-level barriers, it is arguably the meso-level barriers (i.e. the barriers that arise within operational organizations or in the interactions between them) that have been identified as the toughest hurdles. In particular, MaaS research has highlighted uncertainties regarding viable business and governance models for MaaS (e.g. Aapaaja et al., 2017; König et al., 2016; Sarasini et al., 2017). Therewith, meso-level issues such as technical integration, branding, customer relations, and data sharing remain unsolved (Smith et al., 2019), thus stalling MaaS-related collaborations.

To lower meso-level barriers, many prevailing MaaS reports (cf. Utriainen and Pöllänen, 2018 for an overview) have suggested that intermediary actors that mediate the offerings from Transport Service Providers (TSPs) to those operating MaaS (MaaS Operators) should be introduced to the MaaS ecosystem (e.g. Datson, 2016; Goodall et al., 2017; Holmberg et al., 2016; Kamargianni and Matyas, 2017). Different terms and framings have been applied to such actors, for instance Data Providers, B2B Integrators and Platform Service Providers. For the purpose of this paper, all intermediary actors that take on the MaaS integration role will collectively be labeled as *Intermediary MaaS Integrators* (IMIs), and the following definition is used:

Intermediary MaaS Integrators are intermediate actors that collect the offerings from TSPs (i.e. actors that provide personal transport services) and distribute these to MaaS Operators (i.e. actors that take the MaaS operation role) in order to facilitate the development, operation and management of MaaS.

The suggested potential effects on MaaS developments from the introduction of IMIs include lowering meso-level barriers related to technology, collaboration and business models. For instance, Datson (2016) pinpoints data transfer between TSPs and MaaS Operators as key for enabling MaaS, and states that IMIs can facilitate this by offering data and analytics capabilities. Similarly, Kamargianni and Matyas (2017) identify IMIs as important actors based on the premise that the MaaS concept relies on the availability of interoperable data. Beyond data and analytics capabilities, Goodall et al. (2017) propose that IMIs also can remove collaboration barriers that would arise if MaaS Operators were to negotiate directly with TSPs. Additionally, Holmberg et al. (2016) argue that IMIs could streamline development costs and increase the pace of beneficiary technical developments, such as the standardization of technical interfaces.

However, empirical research on IMIs is, to the best of the authors’ knowledge, currently lacking. As a consequence, the understanding for how their introduction impacts the pace and trajectory of MaaS developments is limited. Given this knowledge gap, and set against the backdrop of a widespread and outspoken desire to support MaaS developments (e.g. MaaS Alliance, 2017; Finnish Transport Agency, 2015; Stockholm County Council, 2016), the underlying purpose of the reported research is to explore if and, if so, how IMIs can facilitate MaaS developments. Especially, to better understand the preconditions for acceptance and adoption of IMIs, the research focuses on how TSPs and prospective MaaS Operators perceive IMIs’ value propositions.

We report from a case study that analyzes *Mobilitetstorget* – a failed attempt to introduce a national IMI in Sweden. *Mobilitetstorget* was deemed as an appropriate case for exploring TSPs’ and prospective MaaS Operators’ viewpoints on IMIs for two reasons. Firstly, *Mobilitetstorget* is one of the first comprehensive attempts to introduce an IMI. Secondly, *Mobilitetstorget*’s collaborative development process forced TSPs and prospective MaaS Operators in Sweden to contemplate their position in relation to IMIs. In contrast to the aforementioned propositions on IMIs, *Mobilitetstorget*’s rise and fall indicate that the introduction of IMIs might be contested, and that the other operative actors in the emerging MaaS ecosystem foresee both positive and negative effects. Thus, this paper sets out to deepen the understanding of how IMIs value propositions are perceived by exploring the following research question:

What hopes and fears do TSPs and prospective MaaS Operators in Sweden have vis-à-vis *Mobilitetstorget*?

2. *Mobilitetstorget*

Mobilitetstorget (approximately ‘The Mobility Arena’ in Swedish) was a child of Samtrafiken, a development company jointly owned by 37 public and private actors in the Swedish transport service industry. Samtrafiken’s mission is to improve the conditions for public transport users in Sweden by coordinating collaboration between its owners, and to promote public transport so that it generates increased revenue for the owners’ businesses.

In the spring of 2017, following a twelve-month pre-study that had explored how to facilitate future MaaS developments (via discussions with 30 Swedish transport actors, mainly TSPs), Samtrafiken launched a development program entitled the Swedish Mobility Program (Samtrafiken, 2017). The program description stipulated that it would: examine how to develop a national

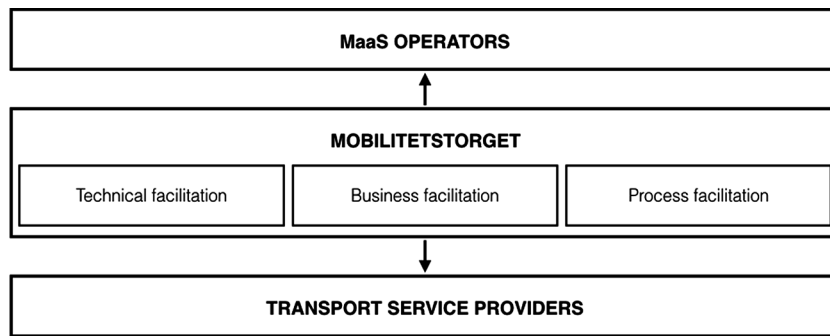


Fig. 1. The setup of Mobilitetstorget.

integration platform for MaaS, establish a technical coordinator role, and negotiate a joint business agreement. In other words, the program team was supposed to develop a plan for how Samtrafiken could become an IMI for the Swedish market. In September that same year, after further extensive dialogues with TSPs, prospective MaaS Operators and suppliers of technical platforms, Samtrafiken presented such a plan to its board of directors. The plan proposed establishing a new business unit within Samtrafiken, designated ‘Mobilitetstorget’.

Mobilitetstorget, as described to the board of directors, was to be organized as an intermediary marketplace that connects two types of actors, TSPs and MaaS Operators. The proposed primary value for MaaS Operators would be access to TSPs’ offerings via one technical platform and enabled by a single contract. Furthermore, Mobilitetstorget would offer MaaS Operators auxiliary technical functionalities that they otherwise would have to develop themselves (e.g. a multimodal travel planner). For TSPs, Mobilitetstorget was proposed to offer a single gateway to multiple new sales channels. This was suggested to provide opportunities to reach new users (i.e. customers), while reducing the technical and relational burdens, compared to if the TSPs would directly interact with MaaS Operators. Thereto, Mobilitetstorget promised TSPs influence over reselling conditions and held that this would create better conditions for sound MaaS businesses.

In order to produce these values, Mobilitetstorget’s work was organized into three types of core activities: technical, business and process facilitation, see Fig. 1. The technical activities included overseeing the implementation of a technical standard for ticketing and payment interfaces, as well as administering the development and managing the operation of an integration platform for MaaS. The business-related activities were threefold, meaning that Mobilitetstorget would: implement and continuously improve a regulatory framework regarding the responsibilities and rights of TSPs and MaaS Operators; manage and administer standard agreements; and provide services such as financial clearance and statistical reports. Finally, the process activities were in some sense a continuation of Samtrafiken’s role in the Swedish Mobility Program. That is, Mobilitetstorget would facilitate MaaS developments by acting as a collaboration arena, by disseminating MaaS-related knowledge, and by providing first-line support for technical and business-related issues.

In addition to being grounded in insights from the Swedish Mobility Program, Samtrafiken’s idea of introducing a national IMI was also supported by the Swedish national roadmap for MaaS developments (Pernestål Brenden et al., 2017). In its first version, the roadmap identifies “establishing an access point that allows public transport offerings to be searched, combined, sold, distributed, validated and settled” (p. 5) as a prioritized goal. Samtrafiken’s idea was moreover in line with the MaaS strategies of the two largest PTAs in Sweden, the [Stockholm County Council \(2016\)](#) and [Region Västra Götaland \(2017\)](#). Still, Samtrafiken’s board of directors rejected the proposal. The board, which consists of six representatives from regional PTAs, four representatives from private transport-related companies and a chairman from outside the transport sector, judged that the benefits of Mobilitetstorget would not be sufficient to motivate the required direct and indirect investments. In particular, they argued that Mobilitetstorget did not have enough support from TSPs and that it was uncertain whether or not MaaS Operators would be interested in Mobilitetstorget’s technical and business-related services. Therefore, they commissioned Samtrafiken to put the technical and business-related activities ‘on ice’, while still pursuing their process facilitation work.

3. Method

The study reported in this paper was initiated shortly after the board’s decision to cancel the development of Mobilitetstorget. It was designed as a convergent mixed-method case study in the sense that qualitative and quantitative data were collected and analyzed in parallel, and then compared following a side-by-side approach (cf. [Creswell, 2009](#)). Still, due to the exploratory purposes of the study and the greater information-richness of the qualitative data, it was used as the principal data source, whilst the quantitative analysis was mostly used to triangulate and validate the suppositions drawn from the qualitative analysis.

3.1. Data collection

In preparation for the primary data collection, documentation regarding the development of Mobilitetstorget and the decision to reject it was assembled. A review of this documentation provided a basic understanding of the case as well as informed both the

Table 1
Interviewee sample.

Interviewee subgroups	Interviewees (<i>representatives for</i>)
Public TSPs <i>i.e. authorities currently procuring transport services</i>	Three small regional Public Transport Authorities Three large regional Public Transport Authorities Three Municipalities managing bike-sharing systems
Private TSPs <i>i.e. companies currently operating transport services on a commercial basis</i>	Three Public transport companies Three Taxi companies Three Car-sharing companies Three Rental car companies
Prospective MaaS Operators <i>i.e. companies that strive to become MaaS Operators</i>	Three small MaaS Operators Three large MaaS Operators

sampling and the formulation of an interview protocol and questionnaire.

Qualitative data was collected through 27 semi-structured (recorded) interviews with an average duration of one hour. The interviewees were purposively sampled, meaning that they were deliberately chosen based on their qualities (cf. [Tongco, 2007](#)). In this case, the group of interviewees was selected to represent the diversity among TSPs and prospective MaaS Operators in Sweden, see [Table 1](#).

The interview protocol (see Appendix A) consisted of two phases: the first phase covered five questions regarding MaaS developments in general (experiences, perceived barriers, key factors for future developments, the role of the public sector, and potential impacts of MaaS diffusion); and the second phase covered five questions regarding Mobilitetstorget (participation in the Swedish Mobility Program, perceived value proposition, financing, management, and potential implications). Further, the protocol included textual and visual representations of MaaS and Mobilitetstorget, which were used as so-called mediating tools (cf. [Karlsson, 1996](#)).

Quantitative data was collected through a questionnaire to the same sample. In an attempt to avoid putting words in the mouths of the respondents before the interviews, the respondents were asked to react to a set of Likert-scale statements (cf. [Likert, 1932](#)) after each phase of the interview (see Appendix A). The statements (29 in total) concerned background knowledge regarding MaaS and Mobilitetstorget respectively, as well as potential barriers to and impacts of each concept. The statements that dealt with barriers and impacts were based on the initial review of secondary data regarding Mobilitetstorget as well as on findings from previous observations of Swedish MaaS developments and studies of other innovation intermediaries situated in the public transport sector in Sweden (cf. [Smith and Akram, 2017](#)).

3.2. Analysis

The analysis procedure centered on the qualitative data, following the recommended (iterative) process in [Creswell and Plano Clark \(2017\)](#) and taking inspiration from [Charmaz's \(2006\)](#) descriptions of coding and memo-writing techniques. The major phases of the analysis are summarized in [Table 2](#).

The first author first listened through and transcribed the interviews, and inductively developed initial codes. Thereafter, the codes were iteratively clustered and refined using a focused coding technique. This work resulted in 843 quotes organized into 128 codes (54 quotes were linked to two codes and 780 to one code). Additionally, the codes were categorized into 11 code groups, see [Table 3](#).

A cross-tabulation matrix of the codes and the three interviewee subgroups (cf. [Table 1](#)) was developed to examine similarities and differences between the subgroups. The cross-tabulation illustrated the total number of quotes and the number of informants (both normalized) per code across the subgroups. Among other things, this revealed consistent as well as inconsistent perspectives on MaaS (as described further in [Section 4.1](#)).

Subsequently, the codes and quotes in the code groups directly related to Mobilitetstorget (Advice, Mobilitetstorget, and Samtrafiken) were further investigated and interpreted using mind-maps and memo-writing techniques (cf. [Charmaz, 2006](#)). This

Table 2
Analysis process.

Phases	Activities
Prepare	Transcribing interviews
Explore	Exploration of interview recordings and transcriptions
Analyze	Initial coding; focused coding; clustering
Represent	Cross-tabulation; mind-maps
Interpret	Memo-writing; comparisons to literature
Validate	Triangulation with quantitative data (box plot, Kruskal-Wallis test); discussions with academic peers and with involved practitioners

Table 3
Code groups.

Code groups	Codes	Quotes	Description
Activities	6	83	On-going MaaS-related activities, e.g. strategic & technical preparations
Advice	6	31	Advice for future work on Mobilitetstorget, e.g. focus on the catalyst role
Barriers	33	272	Barriers to MaaS developments, e.g. sharing customer ownership & data
Conditions	6	20	Current conditions that MaaS must relate to, e.g. transport is a low-margin business
Driving forces	5	22	Motivations for interest in MaaS, e.g. attract new customers & political reasons
External effects	4	23	Anticipated external effects of the diffusion of MaaS, e.g. reduced car mileage
Internal effects	9	63	Anticipated internal effects of the diffusion of MaaS, e.g. more customers
Key factors	14	75	Key factors for development & diffusion of MaaS, e.g. standardized ticket interfaces
Mobilitetstorget	26	197	Perceptions of Mobilitetstorget, e.g. too much commitment too early
Roles	13	65	Envisioned roles in MaaS, e.g. MaaS Operator & facilitator
Samtrafiken	6	46	Perceptions of Samtrafiken, e.g. competent & credible

iterative procedure revealed three fundamental (and interrelated) dimensions of IMIs. These were designated: Activities, Management, and Processes. Still, this phase of the analysis was primarily centered on uncovering the interviewees' understandings and perceptions of these dimensions in the given case. As such, the procedure also elicited: anticipated impacts from the proposed Activities of Mobilitetstorget; major benefits and vital shortcomings of the Management organization; and conflicting views on the development Process. Illustrative quotations were identified to help communicate these findings, and an illustration demonstrating links between Activities and anticipated impacts was developed.

Thereafter, the quantitative data from the questionnaire was added to the mix. A non-parametric analysis was performed in two steps. Firstly, the responses to the Likert-scale statements were visualized as box plots (min, median, max and quartile values), showing to what extent the group of interviewees agreed or disagreed with the 29 statements. The box plots assisted triangulation of the findings from the qualitative analysis by enabling a comparison between the authors' interpretations of the qualitative data and the self-reported quantitative data. Secondly, a Kruskal-Wallis test (cf. [Breslow, 1970](#)) was performed to search for significant differences between the three subgroups' responses.

To further interpret the findings as well as to develop implications, the results from the analysis were compared with existing MaaS studies. The development of implications also drew on prevailing insights from research streams studying related concepts: open innovation intermediaries – actors that intermediate between innovation seekers and external innovators (e.g. [Hallerstede, 2013](#); [Hossain, 2012](#); [Lopez-Vega and Vanhaverbeke, 2009](#)); transition management – governance of long-term sustainability transitions (e.g. [Rotmans et al., 2001, 2001](#); [Smith et al., 2005](#)); and two-sided markets – marketplaces that catalyze virtuous cycles across and within distinct groups of actors (e.g. [Armstrong, 2006](#); [Eisenmann et al., 2006](#); [Evans and Schmalensee, 2010](#)). Furthermore, to improve the validity, the findings and the proposed implications were presented for, and debated with, peer transportation scholars and MaaS stakeholders in Sweden (including many of the interviewees) on multiple occasions.

4. Results

In this chapter, the interviewees' overall perspectives on MaaS are first summarized in [Section 4.1](#) in order to provide a baseline for understanding their attitudes towards Mobilitetstorget. Then, the interviewees' perspectives on Mobilitetstorget's Activities, Management and Processes are outlined in [Sections 4.2–4.4](#), respectively.

4.1. Perspectives on MaaS

A majority of the interviewees described themselves as knowledgeable about MaaS. Still, their understandings differed in terms of at what level of detail they had reviewed the concept. In general, the MaaS Operators and the TSPs that operate traditional public transport modes had more comprehensive knowledge, possibly because these actors had been more involved in the Swedish Mobility Program. Further, most of the interviewees said that their organizations were currently actively working on MaaS, where the most common type of reported activity was participation in exploration-oriented collaborations such as MaaS-related pilots, partnerships with academia, and multi-actor discussion forums. Nonetheless, some differences were also apparent. For instance, the private TSPs were not as vigorously trying to prepare their organizations and their offerings for MaaS, compared to their public counterparts. The underlying motives also differed in that beyond the shared interest in attracting new user segments to their services, the private TSPs often spoke about MaaS as the future organization of the transport system, which they would have to adapt to, whether they liked it or not.

We will end up like that [with brokers in dominant positions]. All industries are going there. ...So this will happen, it's just a matter of when. – IP8, Private TSP representative (translated)

In line with the fundamental motivations for their interest in MaaS, both public and private TSPs believed that a diffusion of MaaS would help them attract more users. In general, there was a strong consensus that MaaS would decrease the modal share for private cars and increase the market shares for public transport and other types of transport services, such as car-sharing services, rental cars, taxis and bike-sharing. Further, the TSPs thought that they would get better information about their users and become better at

meeting users' needs, if MaaS were to become widely adopted. Despite these anticipated benefits of MaaS, they were not convinced that their profits would increase, and they also affirmed that they would become more dependent on other organizations due to MaaS.

If you combine multiple modes of transport, by definition you become dependent on each other, [at least] in some way – IP14, Private TSP representative (translated)

A majority of the interviewees thought that regulations and policies, difficulties collaborating, organizational inertia, lack of knowledge, costs and technical problems would inhibit the development of MaaS. They also unanimously pinpointed designing business models that are viable for all actors as one of the biggest challenges for MaaS. Still, the emphasis on specific barriers diverged across the three interviewee subgroups. The Public TSPs were more concerned about integrating MaaS with urban planning and the difficulty of addressing rural dwellers' needs. They also experienced greater problems with internal prioritizing, compared to the other subgroups. The Private TSPs stressed issues related to branding and shared customer ownership more frequently than others, while the MaaS Operators were most concerned by the lack of transport services to include in MaaS offerings. In particular, the MaaS Operators spoke about few alternatives and the restricted geographical coverage of privately operated transport services. Furthermore, the MaaS Operators identified the uncertainty regarding which roles actors will take in relation to MaaS as making it difficult to motivate internal MaaS efforts, and challenging to attract external investors.

There are so many chickens and eggs here. [The TSPs] will understand [MaaS] the day that they see customers that they didn't have before, and that money is flowing into their bank accounts. And with the investors, it's not until you can show that [MaaS] works that they are willing to join, which you cannot show if they don't join. – IP22, MaaS Operator representative (translated)

In summary, all interviewees were aware of MaaS and all the organizations that they represented were actively considering how MaaS might impact their businesses. Although the Kruskal-Wallis test did not identify any significant differences between the subgroups' responses to the MaaS-related statements (Q1-Q4 in Appendices A and B), the qualitative analysis showed that MaaS Operators and Public TSPs in general had a more positive attitude towards MaaS, compared to the Private TSPs.¹ Beyond the consensus regarding the need to address legal and business model-related barriers, the qualitative analysis also illustrated that the perceptions of barriers differed across the subgroups.

4.2. Perceived impacts of proposed activities

The qualitative analysis revealed that the interviewees foresaw nine types of impacts of the proposed activities of Mobilitetstorget – six that they thought would generally facilitate the development of MaaS in a manner that contributes to transport policy objectives in Sweden (positive impacts), and three that they deemed as impeding for such a development (negative impacts). An overview of the links between the proposed activities and anticipated impacts is illustrated in Fig. 2.

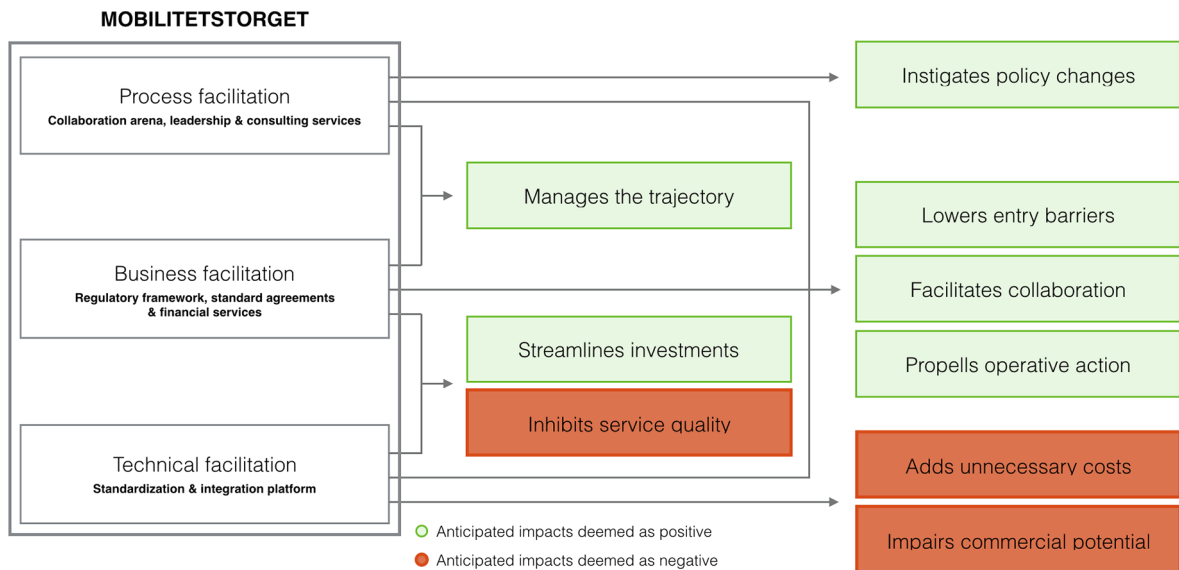


Fig. 2. Links between Mobilitetstorget's proposed activities and anticipated impacts.

¹ However, in the analysis of the questions regarding Mobilitetstorget (Q5-Q7), the Kruskal Wallis test indicated that public TSPs, significantly more than the two other sub-groups, believe that: TSP's want to be on Mobilitetstorget together with competitors; and that TSPs want to delegate control of business agreements to Mobilitetstorget. The results of the quantitative analysis are detailed in full in Appendix B.

According to the interviewees, Mobilitetstorget could, if introduced, **instigate policy changes**. A wide range of allegedly hampering regulation and policies were emphasized during the interviews. Some were perceived to hamper MaaS directly, such as the local government act that delimits what PTAs are allowed to do, while others were said to negatively influence the conditions for the services that are integral parts of MaaS, such as the current national taxation laws that make it difficult to distribute the costs in peer-to-peer sharing services. In its process facilitation capacity, Mobilitetstorget could address both direct and indirect regulation barriers by assembling TSPs' and MaaS Operators' thoughts on needed policy changes, and then, in the role of policy change moderator for MaaS, communicate these to relevant policymakers.

[Mobilitetstorget] should tackle regulatory issues in order to get sharing services to work. ... Their biggest challenge is: how do you get non-commercial services to be included in [MaaS]? I believe that the commercial services will of course want to join, but in some places in the country, they do not exist. Therefore, how can the non-commercial be included in [MaaS] without violating current legislation? – IP6, Public TSP representative (translated)

Although it was contested whether or not it was an appropriate role for Mobilitetstorget, many interviewees stressed the possibility to **manage the trajectory** of MaaS developments as one of Mobilitetstorget's most significant prospective contributions. In the Swedish context, MaaS' potential to contribute to the realization of transport policy targets is frequently held as the underlying aim of MaaS. Many interviewees shared this view, and reasoned that Mobilitetstorget, as an IMI, could be the actor that ensures that this is achieved. In particular, the regulatory framework, the standard agreements, and the MaaS leadership role were identified as Mobilitetstorget's most effective tools in this regard.

Regarding the transport policy goals, it is an advantage if it's an organization like Samtrafiken that leads [the MaaS integration], because they are closely linked to those goals. If it's a commercial actor who leads it, they will [merely] relate to the goals to get an opportunity to get the business started. – IP17, Private TSP representative (translated)

The interviewees said that Mobilitetstorget could **lower entry barriers** to participate in MaaS for both TSPs and MaaS Operators. Fundamentally, Mobilitetstorget could, as an advocate for MaaS, ramp up MaaS awareness and expertise among operative actors. Further, by offering MaaS consultancy services and by developing MaaS functionalities such as the integration platform, the regulatory framework and the standard agreements, Mobilitetstorget could offer actors capabilities that would otherwise need to be developed in-house. In other words, if Mobilitetstorget were introduced, fewer resources would be needed for an actor to join MaaS. According to the interviewees, this holds true for both TSPs and MaaS Operators, and would be especially helpful for smaller actors.

I see a very important role in that there is a national, independent actor that works for and manages the needed technical standards, and that offers expertise to smaller actors who wish to enter the market. – IP7, Private TSP representative (translated)

In addition to lowering the entry requirements for participating in MaaS, the interviewees believed that Mobilitetstorget could **facilitate collaboration**. On a fundamental level, the process facilitation could make it easier for TSPs and MaaS Operators to find each other and team up, while the technical and business-related services could make it simpler to connect technical interfaces and to agree on terms for trading data. In essence, Mobilitetstorget could increase the number of interactions and relations within the MaaS ecosystem. Further, it was noted that a shared vision and a collectively accepted regulatory framework are vital for future MaaS developments, but these require collaboration both within and between the groups of TSPs and MaaS Operators. Mobilitetstorget could play important roles in providing the collaboration arena where such policies are agreed upon, and in administering their enforcement and follow-up.

Our view is that there is a need for a unifying force that sets rules and conditions. I'm probably affected by the fact that I've been working within the public sector for a while, but in some way, someone needs to design the playing field and the rulebook. – IP5, Public TSP representative (translated)

Mobilitetstorget was perceived to be able to **propel operative action**. Its prospective launch would mean that something tangible, and significant from a Swedish perspective, would be happening within the MaaS context. In Finland, the ongoing legislative reform has been a driving force for MaaS since it has symbolized that the government believes that MaaS is the future of transport. In effect, the interviewees argued that the introduction of Mobilitetstorget would similarly illustrate that Samtrafiken's owners believe in MaaS. Beyond making it more attractive to invest in MaaS, this would force TSPs to take a stand in terms of their relation to MaaS. For this reason, the interviewees were hopeful that Mobilitetstorget could break the current gridlock of 'indecisive' actors trying to pinpoint their future roles in MaaS.

Say that Mobilitetstorget would exist today, then, an actor such as [company name removed] would have to decide: will we be a [TSP] or a [MaaS Operator], or will we be both? – IP1, Public TSP representative (translated)

Lastly, among the anticipated impact deemed as positive, the interviewees highlighted that Mobilitetstorget could **streamline investments** by avoiding parallel development of equal or comparable functionalities. In brief, it was asserted that Mobilitetstorget could replace 37 instances of similar developments (i.e. Samtrafiken's 37 owners in this case), as Mobilitetstorget would take responsibility for the integration duties that would otherwise fall to the individual TSPs. As such, the total investment needed from TSPs was projected to be considerably lower if Mobilitetstorget were introduced. Correspondingly, it was mentioned that Mobilitetstorget could provide cost savings for MaaS Operators in a like manner. By offering access to many TSPs through a single integration, Mobilitetstorget was, by some, perceived to lower MaaS Operators' integration costs.

Had Mobilitetstorget been there, our development effort for entering a new region would probably have been less than it's now, technically and business-wise. ...And I feel that it will be quite a bit of work: to find out what tickets, subscriptions, packages and so on, that each regional PTA want to collaborate on, and under what conditions. And this takes a lot of time and is a big expense. – IP24, MaaS Operator representative (translated)

On the negative side, some interviewees believed that Mobilitetstorget would **inhibit service quality** as experienced by MaaS users. As a general critique of MaaS, with extra relevance for IMIs, it was claimed that a portion of the technical functionality inevitably gets lost with every integration. A MaaS Operator that bundles the offerings of several transport services will never be able to offer the same quality of service regarding a particular transport service, compared to if that transport service were offered through a stand-alone app. For instance, a MaaS Operator is unlikely to be able, in their MaaS app, to include selection of individual train seats or to display the entire collection of available child seats when renting a car. In the case of Mobilitetstorget, the gap between the quality of service through the MaaS app and the quality of service through the stand-alone app could potentially become even larger, since it would introduce an additional middleman – increasing the ‘distance’ between the TSPs and the users. This distance could also make it more cumbersome for the TSPs to fine-tune their services to match user demands.

All of us who work digitally fine-tune our services all the time. If the customer only uses the MaaS application, by definition, the functionality will be lower. My customers, who sit in my cars, will not get the full experience, and will not think that we are as good as we are. – IP17, Private TSP representative (translated)

In contrast to the interviewees who argued that Mobilitetstorget could streamline investments, others thought that its introduction would **add unnecessary investment costs**. In particular, the proposed development of the integration platform was disputed. Its estimated development cost was perceived as high, and often positioned in relation to its allegedly limited value for MaaS Operators. Two different arguments were made to support this point. Some said that the MaaS Operators either already have the needed integration functionalities internally, or have the capability to develop them and are prepared to fund this investment themselves. Others held that the standardization of technical interfaces within the personal transport industry in Sweden, currently being implemented (led by Samtrafiken), is enough to enable efficient integration. In both cases, MaaS Operators’ incentives to use the technical services as proposed in Mobilitetstorget were deemed to be low, and the services therefore to be redundant. Furthermore, the proposed setup of Mobilitetstorget was perceived as ill-fitted for the actual business potential of MaaS. MaaS is, currently, perceived as effectively limited to metropolitan areas, as this is the only type of geographical area containing a sufficient range of transport services to integrate, and also where potential users of MaaS have been identified. So, it was seen as costly and unnecessary to build a solution for the possible integration of TSPs across all of Sweden.

I believe that in the short term there is no value in [Mobilitetstorget]. Or nothing, there is certainly something, but I cannot see it. I consider an end customer's perspective (large city): What does the end customer want? They have no need for 37 TSPs integrated in a platform. – IP27, MaaS Operator representative (translated)

One of the most frequently voiced concerns regarding Mobilitetstorget was that it could **impair commercial potential**. The proposed functionalities of Mobilitetstorget would compete with the integration capabilities that several larger actors already have in-house, thus lowering their competitive advantages. Moreover, the setup of Mobilitetstorget, with a common integration platform, a shared regulatory framework and standard agreements for the reselling of all TSPs’ offerings, was said to make it difficult for MaaS Operators to differentiate from each other and stand out in the marketplace. Still, most importantly, Mobilitetstorget would introduce yet another actor in the MaaS value chain with whom to share revenue. Describing the business case for MaaS as uncertain and the personal transport sector as a low margin business, the interviewees said that the introduction of Mobilitetstorget could be the tipping point from profitable to unprofitable, especially if funded through commissions or member fees, as implied in the description presented to the board of directors.

The problem we have with brokers is that the profitability of individual rents is not as good as when we have direct contact [with the customers]. ...Therefore, it's important for us that it's not the old broker models. – IP13, Private TSP representative (translated)

Finally, the analysis of proposed activities shows that some activities were more contested than others. While none of the interviewees disputed the process facilitation, the technical facilitation was highly contested, especially the integration platform. The interviewees who held a generally positive attitude towards Mobilitetstorget frequently identified the integration platform as the main key to unlocking entry barriers, facilitating collaboration, propelling action and streamlining investments. Simply put, they viewed the integration platform as the principal source of beneficial impacts. For the interviewees who were more skeptical towards Mobilitetstorget though, the integration platform was the ‘main culprit’. In addition, contributing to their fear of unnecessary investment costs and impaired commercial potential, it was the combined effect of compulsory use of a specific integration platform and of the introduction of inflexible standard agreements that were described as the potential causes of inhibited service quality for MaaS’ users.

4.3. Attitudes towards the management organization

Beyond the specific activities of Mobilitetstorget, it was also widely debated during the interviews whether or not Samtrafiken is the appropriate host organization. Samtrafiken has a distinctive position in that the company is co-owned by 37 public and private actors across the Swedish transport sector. The owner group is diverse, encompassing both small and large, public and private actors

active in public transport. Additionally, Samtrafiken has 23 official partners who widen the spectrum even more. Partly based on this broad anchoring, but also drawing on Samtrafiken's previous work on nationwide solutions for matters such as technical standardization and open data, several interviewees argued that Samtrafiken has unique capabilities for creating a common agenda for MaaS in Sweden. Among other things, these interviewees thought that this would increase the chances for including offerings that are less interesting for commercial actors, such as transport options in smaller towns and in rural areas. Judging that this is important for MaaS' impact on sustainability, they saw Samtrafiken as a fitting candidate for the management role.

They [Samtrafiken] know public transport, and they know all PTAs....It is important that [the Intermediary MaaS Integrator] is someone who sees everyone, someone who can see the whole picture and not just the large cities. – IP2, Public TSP representative (translated)

However, other interviewees questioned Samtrafiken's ability and incentives to not just do the bidding of its most influential owners. According to these interviewees, the three largest regional PTAs and the state-owned train operator supply the majority of Samtrafiken's funding, and thus are more or less in charge of Samtrafiken's agenda. Stating that none of these actors have the mission to encourage sustainable transport throughout Sweden, rather they are to promote the use of public transport in their regions and to yield a profit, it was argued that they lack motive to support joint investments such as Mobilitetstorget. Hence, these interviewees feared that Samtrafiken's MaaS initiatives would be held back by the lack of interest from these four large actors. One interviewee argued that Samtrafiken's work is regulated by the smallest common denominator among its 37 owners, and in the case of MaaS, this denominator will be very small since the large actors have low incentives both for participating in MaaS in general (as MaaS threatens their currently dominant positions in the market) and for investing in Mobilitetstorget in particular (as it would be more cost-efficient for them to each develop MaaS integration capability internally).

I think their hands are tied behind their back by the 'dragons' [i.e. the most influential owners]. The things [Samtrafiken] want to do, do not fly. – IP8, Private TSP representative (translated)

4.4. Opinions of the development process

Relatively little is known about the customer market for MaaS in Sweden, as well as about MaaS' potential impact on travel behavior. With such uncertainty, many of the interviewees stated that the Mobilitetstorget proposal was in fact not ready for a go/no-go decision at the point of the board of director's decision to reject it. Among other things, the interviewees pointed out that the proposal did not include clear answers regarding the value proposition for MaaS Operators and how Mobilitetstorget would ensure viable and sustainable business models for all included actors. Consequently, many of the interviewees held that the proposed development and financing plan was 'too much, too soon', both in terms of financial investment (direct and indirect) and in terms of setting the strategy for MaaS developments. Rather, they would have preferred more incremental developments in general and additional market pilots in particular prior to investing in Mobilitetstorget and thus determining the ecosystem model for MaaS in Sweden.

I don't remember the exact figure, but we had to commit that one fifth of our tickets should be sold through Mobilitetstorget, or something like that. Our management group felt it was far too early to be able to promise such a commitment. – IP1, Public TSP representative (translated).

A related critique of the development process concerned the lack of considered perspectives. Several interviewees said that MaaS, in general, is driven by technological and industrial developments. Accordingly, these interviewees questioned the lack of user focus in the Swedish Mobility Program. Rather than discussing business models and how responsibilities should be divided between actors, they would have wanted more emphasis on identifying what problems the potential users of MaaS experience in their current situations. Additionally, they complained that the Swedish Mobility Program almost exclusively involved representatives from TSPs and further that it was mostly the public transport actors that governed the program's trajectory, resulting in a lopsided proposal in the sense that it was designed to satisfy Samtrafiken's and the public transport actor's demands while failing to recognize the needs of MaaS Operators and other types of TSPs.

In these discussions [within the Swedish Mobility Program], it is still to a very, very large extent we, the PTAs, who have been involved. One cannot claim that there is as much action from other actors. – IP3, Public TSP representative (translated)

5. Discussion

Drawing on the results of the analysis, this chapter first outlines a set of key dimensions that define Intermediary MaaS Integrators. Thereafter, based on these dimensions, an answer to the research question is provided, i.e. what hopes and fears do TSPs and prospective MaaS Operators in Sweden have vis-à-vis Mobilitetstorget? Lastly, implications for establishing Intermediary MaaS Integrators are suggested and discussed.

5.1. Key dimensions

To understand a new phenomenon, an important initial step is to develop a framework of dimensions that should be considered in analyses (e.g. Gartner, 1985; Oviatt and McDougall, 1994). The literature on IMIs has primarily discussed the activity dimension and

Table 4
Key dimensions of Intermediary MaaS Integrators.

Dimension	Description
Activities	The process-, business- and technical-facilitation undertakings (what)
Management	The characteristics of the management organization and its strategies (who and why)
Processes	The processes for preparation, development, launch, operation and continual improvement (how)
Context	The institutional conditions that influence Intermediary MaaS Integrators (where and when)

proposed technical activities such as operating data transactions (MaaS Alliance, 2017), processing data (Kamargianni and Matyas, 2017), and administrating payments and contracts (Holmberg et al., 2016). Our analysis of Mobilitetstorget expands the notion of what IMIs can do by identifying several further activities, for instance advocating technical standardization and offering consulting services. We also add structure by proposing that the variety of undertakings can be cataloged as process facilitation, business facilitation and technical facilitation activities.

Our analysis illustrates that the activity dimension is indeed significant for the perception of IMIs. Yet, the analysis identifies two additional key dimensions as well: management characteristics; and the development process (in other cases, processes in later lifecycle phases such as operation and continual improvement are important too). Thus, drawing on the 5w1h framework (cf. Sæbø, 2011; Yates and Orlikowski, 2002), we propose these plus the institutional context as dimensions that jointly define IMIs, see Table 4.

5.2. Hopes and fears

Departing from the four key dimensions, the TSPs' and prospective MaaS Operators' biggest hopes and fears vis-à-vis Mobilitetstorget are classified and summarized in Table 5 and discussed below.

Activities: Theorizing MaaS as outbound open innovation from the perspective of the TSPs (cf. Gassmann and Enkel, 2004; Smith et al., 2019), Mobilitetstorget can in turn be conceptualized as an open innovation intermediary (OII), that is an actor that bridges the gap between those seeking solutions to an innovation problem (i.e. TSPs) and innovators that can provide a solution to this problem (i.e. MaaS Operators) (Hallerstede, 2013). Open innovation research has detailed that OIIs' activities can reduce innovation costs (Hossain, 2012), nurture sharing and absorption of knowledge (De Silva et al., 2018; Elmquist et al., 2016; Kokshagina et al., 2017), foster collaboration (Lopez-Vega and Vanhaverbeke, 2009), and help actors in managing the innovation process (Agogué et al., 2017; Katzy et al., 2013). The positive impacts that the TSPs and MaaS Operators anticipated from Mobilitetstorget's proposed activities mirror these propositions, suggesting that they expect IMIs to ultimately provide the complementary capabilities needed for the successful development and diffusion of MaaS (cf. Agogué et al., 2013; Aquilani et al., 2016). However, Mobilitetstorget's proposed activities were thought to have several negative effects as well. These have not been detailed in the literature on OIIs. This might be explained by the fact that Mobilitetstorget planned to intermediate not only open data but also tickets and contractual terms, and moreover ask for economic compensation to do so. As a consequence, Mobilitetstorget's activities might have had a larger impact on affiliated actors' businesses, compared to most previously studied OIIs. Nevertheless, due to the mixed feelings amongst TSPs and MaaS Operators, close consideration of their perspectives seems important when deciding on IMIs' pool of activities.

Management: Samtrafiken has a unique but complex position. In particular, the interviewees expressed both hopes and fears related to their close relations to public transport actors. Among other things, they expressed that Samtrafiken's entangled position infers that they might have a good chance of coordinating a strong and shared MaaS agenda, but also that the actors who do not have incentives to pursue both MaaS in general and Mobilitetstorget in particular might stall developments. This type of trade-off has previously been recognized in transition management literature, that is research on long-term governance of sustainability transitions (e.g. Rotmans et al., 2001, 2001; Smith et al., 2005). Although not always the case (cf. van Mossel et al., 2018), incumbent actors have oftentimes been found to actively resist fundamental changes, basically because they are vested with the current state of affairs (the socio-technical regime) (e.g. Geels, 2014). Therefore, to overcome regime inertia and technological lock-ins, it can be desirable if long-term visions overlook the agendas of incumbent actors (Loorbach, 2007). Still, collaboration between emerging niches (such as

Table 5
TSPs' and prospective MaaS Operators' hopes and fears vis-à-vis Mobilitetstorget.

Dimension	Hopes	Fears
Activities	Proposed activities instigate policy changes, manage the trajectory, lower entry barriers, facilitate collaboration, propel operative action and streamline investments	Proposed activities add unnecessary costs, impair commercial potential and inhibit service quality
Management	Samtrafiken efficiently coordinates a common MaaS agenda, pays attention to transport policy objectives and caters for the needs of all TSPs and MaaS Operators	Samtrafiken is held back by the portion of their owners that have low incentives to pursue MaaS and Mobilitetstorget
Processes	The collaborative development process creates MaaS-related knowledge and disseminates it to TSPs and MaaS Operators as well as to policymakers	The hasty and narrow-minded development process leads to non-optimal and costly solutions for integration
Context	Key TSPs are ready to collaborate on MaaS as they have previously collaborated on technical standardization, open data and multimodal travel planning	Viable MaaS services are difficult to develop due to a lack of transport services to integrate and due to low margins across the industry

MaaS) and incumbent actors might ease the operationalization of visions and the development of new socio-technical regimes (such as servitized mobility) (Loorbach and Rotmans, 2010). In other words, although generating skepticism, close relations to incumbent actors can be favorable for IMIs.

Processes: The development process was perceived as enlightening but too hasty. A reoccurring comment was that better knowledge of MaaS in general, and the potential roles of Mobilitetstorget in particular, would be needed in order to make an informed investment decision. Thus, Mobilitetstorget faced a similar situation as the PTA in West Sweden did about a year earlier – when trying to develop MaaS through a standard procurement procedure, they came to the conclusion that the understanding of MaaS was immature, and that a more collaborative and iterative strategy was needed to drive its development (Smith et al., 2017). The Mobilitetstorget process was arguably very collaborative, but a more incremental approach to its development would perhaps have been less contested. Still, no matter the entry timing, IMIs will always be difficult to launch. Mobilitetstorget can be conceptualized as a two-sided market, that is a marketplace designed to catalyze virtuous cycles across and within distinct groups of actors (i.e. TSPs and MaaS Operators) (Eisenmann et al., 2006). Research has shown that such markets often struggle with attracting early adopters (Caillaud and Jullien, 2003; Evans and Schmalensee, 2010; Stummer et al., 2018). Basically, it is difficult to promote a marketplace that has neither products, nor customers, which was the case for Mobilitetstorget when they faced Samtrafikens board of directors. Accordingly, high degrees of credibility and trust as well as a convincing long-term plan seem imperative for the early success of IMIs.

Context: Aaltonen (2017) developed an index for determining how ready city authorities are for MaaS. It covers metrics that address: local MaaS strategies; parking policies; internal travel policies and practices; availability of ‘shared mobility’; visibility of multimodal options; digitalization of public transport; and existing collaborations. Our study indicates that some of these metrics are significant for the wider readiness for MaaS and IMIs as well. For instance, the interviewees hoped that the fact that the PTAs had previously collaborated successfully on issues such as technical standardization, open data and multimodal travel planning would increase their willingness and ability to collaborate on MaaS. They also feared that the lack of appropriate transport services to integrate would be a deal-breaker for MaaS in Sweden. However, our analysis of hopes and fears vis-à-vis Mobilitetstorget also highlights significant institutional conditions that are not currently covered by the readiness index. In particular, underlying incentives to disrupt current practices and to explore new business opportunities in collaboration with others seem to be cornerstones for MaaS developments, and thus for the acceptance of IMIs as well. Further, our analysis reinforces earlier claims that institutional conditions on all societal levels influence MaaS developments (e.g. Karlsson et al., 2019). Given this insight, and given the collaborative nature of MaaS, individual actors’ readiness for MaaS should probably not be studied in isolation. Rather, MaaS readiness needs to be analyzed from an ecosystem perspective and in a multi-level setting (cf. Mukhtar-Landgren and Smith, 2019).

5.3. Implications for practice

Many interviewees perceived Mobilitetstorget as a public actor. Thus, the conflicting trains of thought regarding its value tangents the on-going discussion amongst both researchers and practitioners on the appropriate level of public sector involvement in the development of MaaS. Comparing the development of MaaS with the past transition to automobility, it has been stated that technological change has so far outpaced the capacity of systems and structures of governance (Docherty et al., 2017), and emphasized that there are risks involved with over-reliance on single operators of innovative services (Pangbourne et al., 2018). Consequently, some researches hold that the roll-out of new types of pro-active governance measures (such as taking new operative roles) is key for capturing societal benefits of MaaS (Reardon and Marsden, 2018). In contrast, other researchers have highlighted that boundaries between transport modes will blur (Hensher, 2017; Mulley et al., 2018), and that the public sector’s chief tasks are to provide open data and to adjust laws on tax reduction and government subsidies so that they encompass MaaS (Li and Voege, 2017). Similarly, proposed roadmaps for MaaS have to a high degree focused on the public sector’s role in paving the way for private sector innovation by ‘opening up’ (e.g. Eckhardt et al., 2017; Pernestål Brenden et al., 2017), thus not necessarily advocating publicly controlled IMIs.

The study reported in this paper did not analyze whether public and/or private actors should occupy the MaaS integration role (cf. Smith et al., 2018a). Thus, we do not address the public-private dimension here. Instead, based on our findings – key dimensions and the hopes and fears of TSPs and prospective MaaS Operators – we propose five strategies for facilitating the acceptance and adoption of an IMI, regardless of whether it is managed by a public or a private actor.

The IMIs’ pool of activities should, if possible, *go beyond offering technical services*. Technical services are the most commonly addressed dimension in the reviewed literature on IMIs. Nonetheless, research has shown that mere access to data is insufficient for triggering innovation (Ubaldi, 2013). Other activities, such as contract management, collaboration support, and meet-ups, have often been identified as key features of intermediaries (e.g. Elmquist et al., 2016; Lopez-Vega and Vanhaverbeke, 2009). In line with this notion, the interviewees unanimously appreciated the proposed process facilitation activities in the studied case. However, not all TSPs and MaaS Operators will be interested in such activities. As IMIs are bound to interact with a diverse group on both ‘sides’ (cf. Smith and Sandberg, 2018), they should preferably permit some variation in the relations to affiliated TSPs and MaaS Operators. For example, in the studied case, the baseline could be the technical services, while the TSPs and MaaS Operators could choose whether or not they want to use the process- and business-related services.

An IMI should ideally *have clear, declared objectives*, and these objectives should be reflected in its activities. Several setups are possible. For instance, if the IMI’s aim is to facilitate timely launches of commercially viable MaaS-concepts, it makes sense to exclusively target the most MaaS-ready TSPs and to adjust its activities after their needs. Among other things, this infers a loose regulatory framework and high adaptivity to current praxis. Further, a commission-based business model might be viable in such a case, as the number of transactions per integration might be fairly high. However, if the chief aim is to enable nationwide diffusion of

MaaS and to ensure that as many shared and active transport services as possible are included, then the regulatory framework should likely be more stringent and place a greater emphasis on consultative activities (e.g. informing TSPs on how to prepare for MaaS), compared to the previous example. Moreover, external funding sources might be a requirement since such a setup would include activities that are difficult to justify on a strictly commercial basis. Nonetheless, irrespective of the objectives, a high level of transparency regarding objectives is important as cross-actor understanding and trust are fundamental in collaborative innovations such as MaaS (cf. Smith et al., 2019).

In terms of management, IMIs should preferably also *be impartial and capable actors*. Impartiality is an important attribute in the relationship with all the TSPs and MaaS Operators, as they do not want to fear disfavor in either the short or long term. Further, equal treatment is particularly important when collaborating with public sector actors. Regarding capabilities, the literature on two-sided markets has identified the ability to change business models, preexisting relations and a good reputation, as well as funds to subsidize customers as important competitive advantages (Eisenmann et al., 2006). Accordingly, an Intermediary MaaS Integrator seems to have better odds to develop a viable business if its management has a large action space, existing relations to TSPs and/or MaaS Operators, and deep pockets.

In the process dimension, IMIs should *carefully consider their launch strategies*. Stummer et al. (2018) outlined six strategies that have proven successful for overcoming two-sided markets' 'chicken and egg'-type of dilemma in the past: a single target group; platform staging; subsidizing; platform envelopment; exclusivity agreements; and side switching. To what extent these can be appropriately applied to launching an IMI is dependent on management-related aspects such as underlying objectives, available funds, and existing relations. Drawing on the studied case, it seems important to consider the perspectives of both TSPs and MaaS Operators, to anchor decisions with key customers (cf. the exclusivity agreements strategy), and to incrementally develop the functionality rather than opting for a big launch (cf. the single target group strategy).

Finally, IMIs should *only be introduced if basic incentives are in place* for TSPs and MaaS Operators to use their services, otherwise one risks throwing money down the drain. The most fundamental in this regard is to establish that there is either a current or latent market for MaaS amongst citizens (i.e. potential users). At present, the market potential for MaaS is largely uncharted, except for a few stated-preference studies (e.g. Ho et al., 2018; Kamargianni et al., 2018; Sochor et al., 2018). In addition to identifying potential users of MaaS, two other baseline requirements are: that the TSPs are looking for partnerships with external MaaS Operators; and that the TSPs think that the IMI's services can help them in that quest. If this is not the case, supplementary actions are likely needed to trigger the incentive to affiliate with an IMI. From a public sector perspective, such action could either be to use hard policy measures, such as forcing TSPs to open up their digital interfaces (as done in Finland, cf. Smith et al., 2018b) or to use soft policy measures, such as incentivizing TSP activities that support the use of shared and active transport modes in general.

6. Concluding remarks

This paper advances the conceptual understanding of Intermediary MaaS Integrators (IMIs) by identifying key, defining dimensions (summarized in Table 4) and by detailing an illustrative example. The paper also deepens the knowledge of how other operative MaaS actors perceive IMIs' value propositions by detailing TSPs' and prospective MaaS Operators' hopes and fears vis-à-vis Mobilitetstorget (summarized in Table 5). Based on these findings, implications for MaaS policymakers and practitioners are proposed. IMIs should only be introduced if basic incentives for using their services are in place, and, if introduced, they should preferably: go beyond offering technical services; have clear, declared objectives; be impartial and capable actors; and carefully consider their launch strategies, in order to facilitate acceptance and adoption.

Drawing on the limitations of the reported study, we suggest three avenues of research that could be explored to further develop and refine our suppositions on IMIs. Firstly, comparative case studies are needed in order to test the transferability of the findings of this paper to other IMIs and dissimilar institutional contexts. Secondly, the reported study focused exclusively on the perspectives of TSPs and prospective MaaS Operators. Complementary studies including the views of for example policymakers, technology providers and citizens (users and non-users of MaaS) could widen the understanding of IMIs (cf. the macro- and micro-levels in Mukhtar-Landgren et al., 2016). Thirdly, and perhaps most importantly, the reported case is limited in the sense that the studied IMI was rejected prior to its launch. Thus, additional studies are needed of successful launches in order to understand later stages of the innovation process as well as actual effects of IMIs on the pace and trajectory of MaaS developments.

Our analysis explored how IMIs can be introduced to gain acceptance from other operative actors, but not whether or not IMIs should be introduced. To tackle that question, more fundamental, unanswered questions about MaaS must first be addressed, such as: how can diffusion of MaaS contribute to fulfilling transport policy objectives? Indeed, despite the "persuasive rhetoric around MaaS that makes grand promises about efficiency, choice and freedom" (Pangbourne et al., 2019, p. 1), the empirical evidence on citizens' interest, the role of MaaS in the transport system, and MaaS' societal impacts is very limited (Karlsson et al., 2017b). As the value of MaaS is yet to be soundly 'proven', research from various perspectives will be vital going forward, both empirical research evaluating the short- and long-term effects of MaaS as well as more theoretical research, for instance departing from: activity theory to investigate the citizen perspective (cf. Strömberg et al., 2016, 2018); critical literature on socio-technical transitions to improve the understanding of political dimensions and equity challenges (cf. Hopkins and Schwanen, 2018; Mladenović, 2019; Nikolaeva et al., 2019); and meta-governance frameworks to explore how governments can transform to better initiate, support and guide MaaS collaborations (cf. Kooiman, 2003; Sørensen and Torfing, 2017).

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Appendices A and B. Supplementary material

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