Mobility as a Service: Comparing Developments in Sweden and Finland

GÖRAN SMITH *Chalmers University of Technology, Sweden,*
K2 – The Swedish knowledge center for public transport, Sweden,
Västra Götalandsregionen, Sweden
JANA SOCHOR *Chalmers University of Technology, Sweden,*
RISE Viktoria, Sweden
STEVEN SARASINI *RISE Viktoria, Sweden*

Abstract

This paper examines how institutional factors influence developments in the field of Mobility as a Service (MaaS). We draw upon neo-institutional theory in order to describe drivers and barriers of MaaS developments in Sweden and Finland. By analyzing similarities and differences across the cases, we identify a set of general implications for MaaS policymakers and practitioners. Developments in Finland demonstrate the importance of top-level support, of inter-organizational collaboration and of trust among key stakeholders. The Swedish case reiterates the need for inter-sectorial collaboration, particularly with regard to creating the right conditions for commercialization, and to involving stakeholders on both strategic and operational levels of the transport sector in developing the vision for MaaS. Lastly, we also assess the utility of the applied theoretical framework, and comment on the necessity of recognizing that both practice-based and structural changes are needed in order to facilitate institutional change.

1. Introduction

Since the concept of Mobility as a Service (MaaS) was introduced in 2014 (Heikkilä, 2014), the term has received much attention in the personal transport sector. During this period, Sweden (SE) and Finland (FI) have acted as global pioneers of MaaS. For instance, the 2014 pilot of UbiGo in Gothenburg (SE) is often referred to as the first in real-life conditions (Sochor et al., 2016), while the 2016 launch of Whim in Helsinki (FI) drew international recognition to the concept (MaaS Global, 2016). However, despite the pioneering roles taken by Sweden and Finland, developments in these two neighboring countries have arguably progressed along different trajectories. Hence, based on 31 stakeholder interviews, we analyze and compare the two cases. In particular, we investigate the role of institutions as key structures given their capacity to bring about differentiated outcomes, with the purpose of identifying a set of general contextual preconditions and stakeholder actions that enable societally beneficial MaaS to flourish. Overall, we aim to address the following research question:

How have institutional arrangements influenced MaaS developments in Sweden and Finland, and what implications can be drawn from these cases?

By developments we refer to a broad set of practices including past and present events and activities that can be related to advances of the MaaS concept. By implications, we refer to two things. First, we refer to a set of insights drawn from the two case studies that can benefit public and private sector practitioners with

an interest in promoting MaaS developments. Second, we refer to a set of theoretical implications drawn from the application and assessment of a framework developed in the Swedish project IRIMS (Institutional fRameworks for Integrated Mobility Services in future cities). Here our aim is to further refine the framework by abstracting conceptual insights, again from the Swedish and Finnish cases.

Our paper is divided into five sections of which this is the first. The next section outlines our research approach, including the IRIMS framework and methods. In section three we depict developments in relation to MaaS in Sweden and Finland, followed by outlining, in section four, formal and informal drivers and barriers that have influenced the two processes. In section five we propose general implications for other cities, regions and nations with an interest in MaaS, prior to discussing the applicability of the utilized conceptual framework. Lastly, we provide some summative concluding remarks.

2.   Research approach

2.1.   Conceptual framework

The IRIMS framework (hereafter IRIMS) (Mukhtar-Landgren et al., 2016, Karlsson et al., 2017) defines MaaS as an integrative concept that bundles different transport modalities into a single, seamless service as a means to provide tailored mobility solutions that cater for users' travel needs. This includes considerations of both passengers and goods. IRIMS' central focus is on the various institutional arrangements that act as both driving forces and barriers to the development and deployment of MaaS. IRIMS defines institutions as 'regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life' (Scott, 2013, p. 56). Regulative elements of institutions are things such as laws that impose coercive control by either allowing or sanctioning certain types of activities. Normative elements refer to values and norms that are embedded in certain well-established roles, and exert control via 'logic of appropriateness' in certain situational contexts. Cultural cognitive elements are typically experienced as 'rules of thumb' among a collective. IRIMS divides these institutional dimensions into formal (regulative) and informal (normative and cultural-cognitive) categories.

IRIMS furthermore delineates institutional arrangements into three additional analytical levels: macro, meso and micro. The *macro* level encompasses societal institutional arrangements, including laws, policies, taxation and subsidies (formal) alongside culture, national identity and societal trends (informal). In practice, the set of relevant macro-level institutional arrangements includes things like transport regulation, the use of subsidies in public transport (PT), cultures of automobility that vary between countries, and the penetration of new sharing economy ideals. The *meso* level includes institutional arrangements at the regional and local levels that are embedded in public authorities and public and private service providers including: regional/municipal transport plans and directives, urban planning, and regional innovation grants (formal) alongside the roles and identities of local PT authorities (PTAs), local cultures of collaboration via innovation networks, and the logical components of existing mobility business models (informal). The *micro* level is that of the individual, referring to the proposed users of MaaS services, i.e. travelers. Institutional arrangements that are relevant at this level include a range of push and pull measures, such as congestion charging, taxation and investments that make certain transport modes more attractive (formal), alongside travel patterns and habitual behavior, self-images, subjective norms and social status (informal).

Despite the use of Scott's definition of institutions, IRIMS focuses more on the rule-like features of institutions that constrain and enable practices. However, Scott's definition of institutions captures their rule-

like features (structures) alongside activities, actions and rituals (practices). This more nuanced understanding acknowledges that the rule-like features of institutions are *intertwined* with the practices they depict as legitimate – institutions also encompass 'routines, procedures, conventions, roles, strategies, organizational forms, and technologies around which…activity is structured' (March and Olsen, 1989, p. 22). Hence institutions can be divided into two realms – institutionalized *structures* and the material realm of *practice*. The two realms are deemed 'mutually constitutive' (Meyer et al., 1994), such that in processes of institutional change, there are adjustments in both realms.

As a consequence of IRIMS comprising a meso level, it acknowledges one type of practice that, alongside the structural aspects of institutional arrangements, is critical the development and diffusion of MaaS. That is, to realize the development of MaaS, there is a need for business model innovations that are based on a new set of inter-sectorial collaborations. Hence, IRIMS notes the importance of collaboration in new business ecosystems (cf. Moore 1996). IRIMS characterizes collaboration as 'a process where various stakeholders from different public, private (and/or public/private hybrids) as well as civil society organizations (i) combine capacities, recourses and expertise and (ii) work together with the common goal to implement a solution or policy or to solve problems of an inter-organizational character' (Mukhtar-Landgren et al., 2016, p. 13).

2.2. Research gap

Until now, little work has been done to identify the way in which institutions influence collaboration in emerging MaaS ecosystems. It is, however, increasingly understood that MaaS necessitates the creation of new roles and associated responsibilities (i.e. practices), such as that of a MaaS operator and integrator (cf. Smith et al., 2017a). Here the question of who takes the role of MaaS operator is a particularly sensitive issue, since some existing transport service providers view MaaS as a potential threat in terms of brand, image and customer relationships. Hence a discussion has emerged regarding roles in the ecosystem, and scholars have noted that different models for ecosystem collaboration may emerge in different contexts (e.g. Holmberg et al., 2015; Kamargianni et al., 2016). In these different models, a common theme is the discussion of the division of roles between private actors and public organizations. For instance, Smith et al. (2017a) outline three ways in which MaaS developments may evolve: via market-driven activities; as a result of state interventions; or as part of public-private collaborations. Regardless of the scenario in question, there exists bidirectional influence between collaboration (a practice) and institutional arrangements (structures). That is, practices are enabled and constrained by existing structures but also have the potential to transform those very structures. Yet IRIMS is silent on the interactions between changes in structure and practice, and how these may influence MaaS developments. In this paper, we examine the relationships between structure and practice, and comment on their relevance for MaaS developments.

2.3. Method

We performed 31 interviews with 34 key stakeholders in Sweden and Finland during the period September 2016 to February 2017. We utilized a semi-structured interview guide to organize the interviews around the three institutional levels recognized in IRIMS – macro, meso and micro – focusing on identifying perceptions of institutional drivers and barriers in relation to the development of MaaS. The interviews lasted between 43 and 112 minutes (average 69) and the respondents consisted of public and private actors directly involved in MaaS developments. The sample is described in Table 1.

	Gothenburg	Helsinki
Public sector	9	8
Private sector	10	6
Research & academia	0	1

Table 1. Respondent sample

In order to analyze the data, we first coded and clustered transcriptions of the interviews inductively in two parallel processes. This resulted in two initial lists of institutional drivers and barriers, one for each case. Then, we applied the IRIMS framework to sort and compare these results. From this exercise, we generated a table describing similarities and differences across the cases in terms of institutional arrangements. Lastly, we revisited individual quotes to decompose and clarify our findings.

3.   Background - MaaS developments in Sweden and Finland

Brief summaries of past, present and planned developments in relation to MaaS in Sweden and Finland are described below and laid out in Figure 1, although neither the descriptions nor the figure can capture *all* relevant developments. Moreover, it should be noted that (i) MaaS developments in Sweden and Finland are entangled, and (ii) both cases are strongly affected by external developments.

3.1.   Developments in Sweden

In the Swedish context, the concept of customized, multimodal mobility packages was initially proposed in 2011 within an R&D project entitled 'The flexible traveler' (*Den flexible trafikanten*). The project, which examined business opportunities associated with multimodal services and sought to initiate processes for their realization, concluded that the conditions were in place for services that provide metropolitan citizens with comprehensive, reliable, customized and usable mobility services that reduce costs, increase flexibility, and contribute to sustainable everyday travel (Boethius and Arby, 2011). The business concept was further developed between 2011 and 2014 in a two-phased R&D project named Go:Smart (Strömdahl et al., 2014). The second phase of the project comprised a well-documented six-month pilot of a multimodal service in the Gothenburg area, called UbiGo (e.g. Sochor et al. 2014, 2015a,b, 2016).

Concurrently, several actors within the Swedish PT sector were realizing that entirely new approaches to how PT is organized and delivered to citizens might be needed in order to meet the widely adopted goal of doubling the market share of PT within Sweden (Grönlund, 2017). For instance, the current regional PTA (*Västra Götalandsregionen* – VGR) in West Sweden first proclaimed their support for such a goal back in 2006 (K2020, 2009)[1], and later based their regional transport strategies around achieving that goal (Bokeberg et al., 2016; Efraimsson, 2012). However, by 2011, several reports were published at both regional and national levels that demonstrated the discrepancies between existing PT budgets (including the one in West Sweden) and the budgets needed for achieving this goal (e.g. Legerius, 2012). Consequently, key persons at VGR, among others, adopted the view that PT must aim to better attract private investments, which was the basis for their keen interest in the outcomes of the abovementioned R&D projects.

The success of the UbiGo pilot, which ran in 2013-14 under the Go:Smart project, had two main results. First, a company was launched early in 2014, named UbiGo AB, that aimed at continuing the service with

---

1   However, at that point they were not the regional PTA – a position they first acclaimed on January 1st, 2012 when PT responsibilities in West Sweden were reorganized and a new PT law was introduced in Sweden.

its existing customer base, then further expanding the service. Second, VGR commissioned its operational company, Västtrafik – that had participated in the UbiGo pilot as a transport service provider – to conduct a pre-study to evaluate the legal conditions and potential implications of taking different roles in forthcoming developments. However, this move created uncertainty regarding the relationship between Västtrafik and external MaaS operators, which contributed to UbiGo AB being closed down in 2014. UbiGo Innovation AB, a new company with the mission of refining and relaunching the piloted service, replaced it later the same year. Currently, UbiGo Innovation plans to relaunch the UbiGo service in Stockholm as part of a EU-funded R&D project (civitas.eu/eccentric).

For Västtrafik, the pre-study led to a decision at the end of 2014 to initiate a procurement process (Frey, 2014). Accordingly, in the spring of 2016, they invited prospective bidders to discuss potential conditions for a service concession agreement regarding a MaaS for West Sweden. After reviewing the response from the participating companies, Västtrafik concluded that offering their tickets for resale, without any additional investment on their part, would fail to drive MaaS developments in a direction that would fulfill the doubling goal (Smith et al., 2017b). First, since the investment costs for MaaS operators would be disproportionate (especially if aiming to develop nation-wide offerings) and, second, because a role as transport provider (and nothing else) would leave Västtrafik with little opportunity to govern the trajectory of MaaS.

As a consequence, Västtrafik teamed up with other regional PTAs in the 'Swedish Mobility Program' (SMP). SMP, which is managed by Samtrafiken[2], aims at developing a national integration platform for transport-related services, i.e. a portal giving MaaS Operators access to transport service data and tickets to include in their MaaS-related offerings. SMP also aims at establishing Samtrafiken as a national MaaS integrator; to co-ordinate a joint business agreement; and to initiate, operate and participate in pilot activities related to MaaS (Samtrafiken, 2017). At present, the integration platform is scheduled for launch in West Sweden in April 2018 and in the counties of Stockholm and Skåne in 2019, if Samtrafiken manages to receive funding for its development and operation.

SMP has also succeeded in promoting the MaaS concept to several key actors. One such actor is the regional PTA in the county of Stockholm (*Stockholms Läns Landsting* – SLL). In 2016, SLL made a strategic decision to enable MaaS developments in the county of Stockholm, positioning itself as a transport service provider in the MaaS ecosystem. In practice, this decision means that SLL envisages that third parties should take the role of MaaS operators. SLL has made short-term plans to make a selected range of tickets available for third-party resale through deep linking. During 2017, SLL plans to initiate and participate in MaaS-related pilots and to analyze legal, business, technical and time-related aspects of permanently enabling third-party ticket resales. In 2018, SLL also plans to approach politicians with a more detailed implementation plan for MaaS (Palmbeck, 2016).

At the national level, MaaS is a salient issue for the Swedish Ministry of Enterprise and Innovation (*Näringsdepartementet*). In 2017, one of their collaborative groups (*samverkansgrupp*) proposed MaaS as a key priority for solving the transportation challenges of the future and established a working group in order to explore potential actions for promoting its development (Näringsdepartementet, 2017). These initiatives led to a national roadmap for the development of MaaS in Sweden (Pernestål Brenden et al., 2017), and a program for overseeing the suggested actions (kompis.me). The roadmap coordinates other strategies, such as SMP and the Swedish Transport Administration's (*Trafikverket*) action plan for Intelligent Transport

---

2   A joint venture that aims to support coordination of PT in Sweden.

Systems (ITS) (Andersson et al., 2014), in which MaaS is again recognized as a prioritized area. Moreover, the national roadmap for MaaS features in the Swedish Transport Administration's proposed plan for the development of the transport system in Sweden between 2018 and 2029 (Kalander and Haraldsson, 2017). Lastly, the Swedish Energy Agency (*Energimyndigheten*) plans to initiate a program aimed at boosting MaaS developments called 'Challenge from Sweden' by the end of 2017.

3.2. Developments in Finland

In 2009, the Ministry of Transport and Communications (*Liikenne- ja viestintäministeriö* – LVM) decided that a major reform of transport market legislation was needed if the public goals for the Finnish transport sector were to be met. The same year, they also authored Finland's first national strategy for ITS. Among other things, the strategy proposed that an increased use of ITS could realize a versatile transport system that guides citizens towards using environmentally sustainable, economical and safe modes of transport, but that this development required a modern, customer-oriented transport policy (LVM, 2009). Hence, LVM initiated the 'Transport Revolution' program, which aimed at developing an entirely new approach for transport policies and policy implementation (Tuominen and Kanner, 2011).

In recent years, the abovementioned ideas have been concretized into proposals. Major legislative modifications have been brought together in a unified act, which LVM has labeled the 'Transport Code'. Key objectives of the Code are to 'promote the creation of new service models, ease market entrance, dismantle national regulation that limits competition and reduce the level of public guidance' (LVM, 2016a, p. 1).

The first phase of the Code, which mainly concerns road transport, was adopted by the Finnish Parliament in April 2017 and will enter into force on the 1st of July 2018 (LVM, 2017). This phase has two parts. First, it aims at lowering permit requirements and tearing down silos between transport markets through deregulation. For instance, the current PT license will be replaced with a passenger transport license; any type of vehicle will be allowed to be used as a taxi, and limits on the number of taxi licenses as well as price regulations for taxis will be removed (LVM 2016a,b). Second, it focuses on enhancing the use of open and interoperable data interfaces. The Code will oblige incumbents as well as new entrants to the transportation market to provide their operational data as well as their single tickets for third-party resale and use. The underpinning idea of the Code is to take advantage of digitalization and enable both the development of better and more agile transport services, and the integration of them into MaaS offerings. LVM proposes that these changes will streamline the public role in personal transport, with the concrete goals of achieving a 10% savings in publicly subsidized passenger transport from 2017 (LVM, 2017).

The development of MaaS is closely coupled with LVM's work on reforming transport market legislation. The idea of creating multimodal mobility packages was, in the Finnish context, first promoted at a LVM think tank in 2012[3], and LVM has since used the idea of MaaS as the crown jewel of their envisioned future smart transport system. Several members of the think tank began promoting MaaS – 'the Netflix of transportation' – all over Finland, but it was first when MaaS was introduced as a key topic at the ITS European Congress in Helsinki in 2014 (Heikkilä, 2014) that it began receiving international attention (e.g. Hellmann, 2014; Wile, 2014).

---

3   The idea was presented by Sampo Hietanen, then CEO of ITS Finland, who later became CEO of Maas Finland Oy, subsequently MaaS Global Oy.

In the beginning of 2015, LVM and the Finnish Funding Agency for Innovation (Tekes) launched a joint program for the development of MaaS. As a first action, Tekes published a call for MaaS operators. Eight pre-studies were funded, and in the end several MaaS-related pilots were performed around Finland during 2015 and 2016. The telecom giant Telia Finland Oy (previously Sonera) developed a MaaS application called Reissu, and conducted two pilots, one for commuters in the city of Hämeenlinna and one for tourists heading to the ski resort Ylläs, before selling the brand to the Finnish company Semel Oy in December 2016. Tuup Oy, a start-up company, launched the first version of a MaaS application in 2016. So far, it enables purchasing PT tickets in Turku and hailing taxis in some areas, as well as exclusive access to Kyyti, a taxi-pooling service that currently is available in Oulu, Turku and Tampere. Sito Oy, a Finnish consultancy firm, piloted a MaaS application, Kätevä, in Seinäjoki between November 2016 and April 2017. The service provided three types of mobility packages that combined local buses, demand responsive transit and taxis. Sito Oy is currently analyzing the results of the pilot.

Still, it is the activities of MaaS Global Oy (previously MaaS Finland Oy) that has received the most attention. In May 2015, 23 organizations partnered to cooperate in the establishment of a company that could take the MaaS operator role. In the end, eight of the organizations invested in the idea and in December the same year MaaS Global was registered as a company. In June 2016, MaaS Global publicly launched its first service, Whim, and began offering it to pilot customers in a beta test in Helsinki from October the same year. Whim customers access regional PT, car rentals and taxis via different subscription packages. PT access was enabled through a business agreement with HSL, the regional PTA, which allows MaaS Global to resell their single tickets. In 2017, MaaS Global raised additional venture capital, and is currently preparing to expand to Amsterdam, NL, West Midlands, UK and Singapore, SN.

In addition to LVM and Tekes' joint MaaS program, another public actor, Export Finland, has launched a growth program for MaaS, aimed at helping Finnish MaaS-related ventures to attract international investors and to and seize global business opportunities.
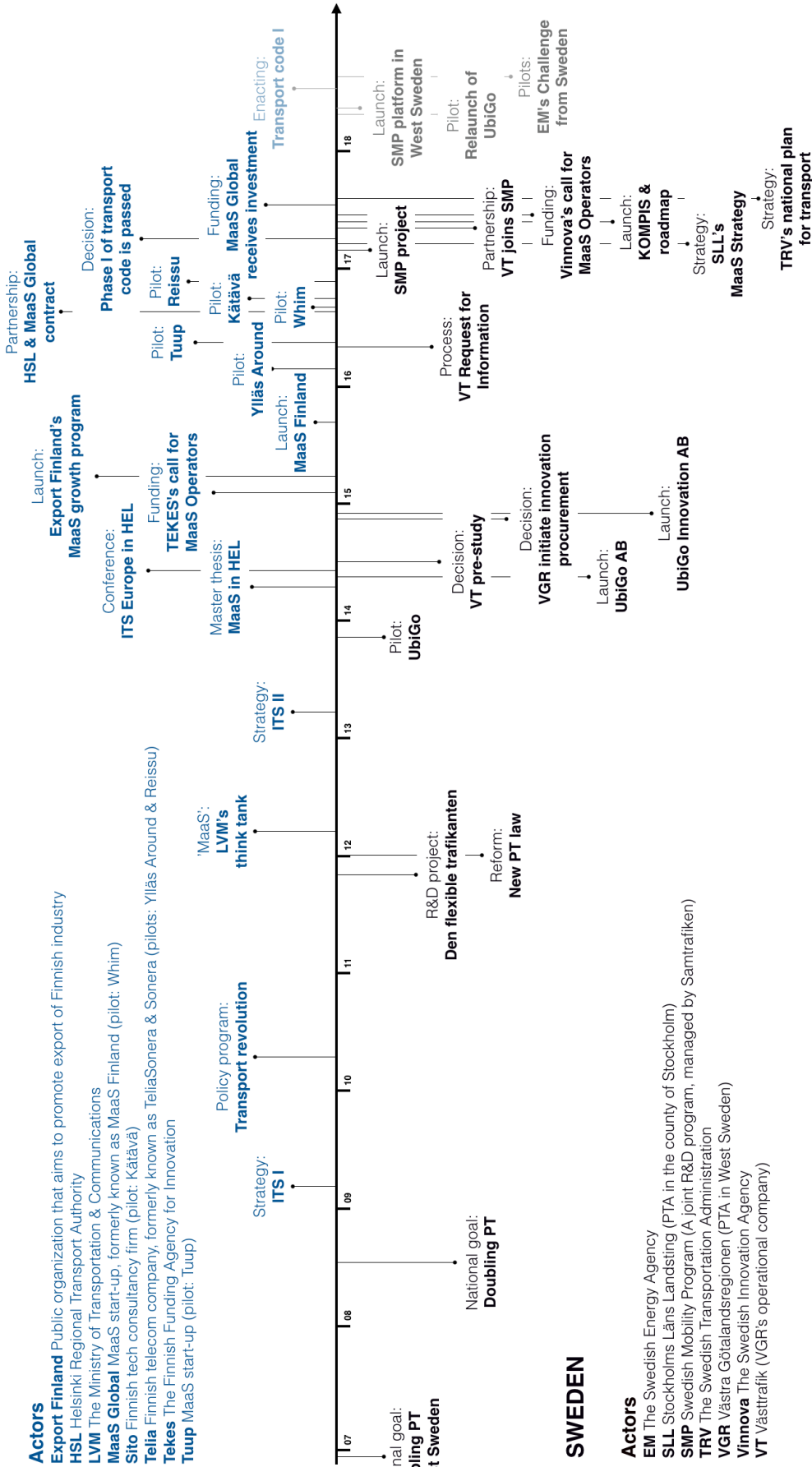
Figure 1. Key events in the development of MaaS in Sweden and Finland

4.   Results – Institutional conditions

4.1.   Macro-level conditions

In Finland, there is an ongoing political movement towards deregulation and increased market orientation. For instance, when entering office in 2015, the current government proclaimed that Finland will be 'a land of solutions' (Sipilä, 2015). The government identified three means to achieve this vision: digitalization, experimentation and deregulation. Regarding deregulation, LVM has been investigating a reformation of the transport market for almost two decades and recently succeeded in getting the first phase of the Code through parliament. As a result, there is a strong likelihood that the existing, heavily regulated PT and taxi markets will be opened up. As such, MaaS seems likely to be market-driven in Finland (cf. Smith et al. 2017a). In Sweden, the PT market has already undergone several phases of deregulation since 1989 (Jansson and Wallin, 1991). The most recent change was in 2012 when, among other things, the rail market was deregulated allowing commercial operators to deliver rail travel on any regionally governed route (Transportstyrelsen, 2012). Ringqvist (2016) notes a tendency towards transport regulation following regulatory cycles with four stages: (i) regulated public monopoly; (ii) competitive private supply; (iii) private sector area monopoly; and (iv) regulated private local monopoly (cf. Gwilliam, 2008). Accordingly, there does not seem to be any shift towards further deregulation in the Swedish transport sector, why the development of MaaS might be more likely to follow a public-controlled or public-private route, compared to the development in Finland (cf. Smith et al. 2017a).

In Finland, communication and transport are governed by the same ministry (LVM). This has enabled the Finnish government to make structural links between transport and ICT. This is not the case in Sweden. Also, the struggling Finnish economy and the nation's long tradition within ICT and digitalization are key to LVM's interest in MaaS. Since the global financial crisis of 2009, Finland has had one of the poorest performing economies within the Eurozone (Khan, 2015). During this period, ICT and digitalization have been the biggest contributors to national economic growth. Much of the human capital from Nokia has moreover remained in Finland since the telecom giant's collapse. Hence, LVM has substantial incentives for keeping ICT and digitalization in focus when looking for new recipes for future growth (Leviäkangas, 2016):

> After Nokia had sold its mobile phone [technology] and it looked quite grim for the Nokia group itself, we still had a lot of resources in Finland that were interested and knowledgeable in this area [ICT]. So, it is also an institutional explanation, why just Finland; there was a technological and mental maturity to address these problems. And there was some time, people had time. – IP3 Finland (translated)

The development of the Finnish Code has been closely coupled to MaaS developments. Several Finnish respondents noted that LVM in general, and the minister for transport and communications in particular, have paved the way for MaaS development in two ways. First, by communicating a 'national' agenda that seeks to enable MaaS development, drawing attention to the concept, and making it easier for start-ups to find investors and to convince transport service providers to jump on the bandwagon. Second, by proposing the deregulations and regulations required to drive the development, such as requiring transport service providers to make single tickets available for resale. Several private sector respondents in Finland also expressed that they felt included in policy developments, suggesting that Finland's small and centralized nature may be beneficial for such inclusion. These respondents noted that many stakeholders from the transport and communication sectors, including the politicians and civil servants at LVM, know each other well and have strong formal/informal ties, given regular informal meetings.

In contrast, the Swedish government has only recently become interested MaaS, and existing regulatory institutions have, until now, been perceived as an obstacle that constrains public actors' action space. This is particularly the case for PTAs (cf. Smith et al., forthcoming). Also, MaaS developments have, so far, mainly occurred in Gothenburg, whereas most government agencies are situated in Stockholm.

Further, MaaS is supported by different rationales in the two countries. In Finland, MaaS is typically motivated by the idea that public spending on transport must be streamlined and that economic growth will result from cross-industry collaborations and sound market competition. In Sweden, MaaS interests are rather the result of the goal to increase the modal share of sustainable modes in general, and PT in particular.

> What does Västtrafik want to achieve with MaaS[4]: To develop a service that is as useful as possible for the customer. That it should be…that we should be able to reach new customers with this service – those we do not reach today. We have a doubling goal [for PT's market share], which we think this service can help us achieve. – IP4 Sweden (translated)

Finnish respondents argued that the organization of PT in Finland is an institutional barrier to MaaS. In contrast to Sweden, Finland does not have regions. Hence, the responsibility for PT and PT subsidies is either on the state or municipal level. In Finland, single tickets are not subsidized, and each municipality has the responsibility for subsidizing its 'own' residents' PT passes. Hence the PTA in the Helsinki area (*Helsingin seudun liikenne* – HSL), which is governed by eight municipal political bodies, must keep track of their customers' places of residence when selling other types of tickets than single tickets. In Sweden, all types of PT tickets and passes are subsidized at the regional level, regardless of the traveler's place of residence.

4.2. Meso-level conditions

During interviews, several Finnish respondents noted the importance of a set of key players, described as 'MaaS champions'. These actors are positioned in many of the most influential roles within key public and private organizations such as the LVM (both politicians and civil servants), within leading start-ups and at the City of Helsinki. The development of the Code, which is tightly coupled to MaaS development, has been characterized in terms of cross-sectorial discussions between MaaS champions. Finnish respondents also noted the importance of both informal and formal gatherings, and declared how fortunate they were to experience such an open and collaborative climate:

> The new minister set up [a] sort of think tank for new mobility [with] high-level people from public and private sectors [and] research. And [the future CEO of MaaS Global] took this idea in there and it really got a flying start in that think tank. …With all that feedback it drove him further. He became the CEO of ITS Finland so it was easy for him to start pushing it more and more, and at the same time the ministry really picked it up, because they saw that this could be something, and then [they proposed] this law [the Transport Code]. We need to be thankful for our ministry because they have been really pushing; they are really one of the main key drivers in the background. – IP4 Finland

In contrast, Swedish respondents did not mention a consistent set of key players (although the CEO of UbiGo Innovation was mentioned during several interviews), and Sweden has, until very recently at least, not created a similar climate of formal/informal collaboration to facilitate cross-sectorial discussions. Further, many key actors in Finland share a vision for MaaS development, whereas very few Swedish respondents spoke of such a phenomenon in Sweden. As a result, there is arguably more tension and mistrust between certain public

---

4   Phrase used in Swedish: combined mobility (kombinerad mobilitet).

and private actors in Sweden than in Finland (Smith et al., forthcoming). In Sweden, this is highlighted by the UbiGo pilot, which, despite its success, was followed by a lack of consensus over the next steps, and both VGR's decision to initiate an innovation procurement procedure and Västtrafik's subsequent actions have been heavily criticized by some of the other actors involved in the development of MaaS in Sweden:

> They [Västtrafik] lack knowledge and self-awareness. Then it's also a natural reaction. If you were [situated] in a development department and loved what you did, and someone asked: Should we outsource this assignment to an external consultant or would you like to do it at the department? ...It was a bit like putting a wet blanket on the whole [development of MaaS in Sweden]. – IP10 Sweden (translated)

Analysis of the meso level highlights two major barriers that are consistent across each case. First, the fact that the PTAs do not allow for third-party ticket resales is seen as a major obstacle to MaaS, both in Sweden and Finland. Although HSL has developed a contract to release single tickets, so far only signed with MaaS Global, and several PTAs in Sweden plan to provide their tickets through the SMP platform, PTAs' unwillingness to cooperate is often portrayed as the main decelerator to the commercialization of MaaS. Respondents also cited technical issues as part of the problem, such as a lack of reliable open data and the non-existent standardization of interfaces. Respondents argued that the PTAs' obstinacy on the ticket resale issue is primarily related to a protectionist mindset, risk aversion and organizational inertia. That is, PTAs do not want to risk market shares and customer relations, and are slow at adapting to changed circumstances, which is generally due to the nature of publically administered bureaucracies. Several respondents were of the opinion that PTAs are afraid of losing monopoly positions and losing control of the transport sector:

> That's the biggest problem in transport, everybody thinks that 'we have to be in power'. When I talk to the train-sharing monopoly they say; 'yeah, we need to control the customer, we need to control this market, we need to control'. Look, you can't! – IP9 Finland

Second, uncertainty regarding MaaS business models was probably the most heavily discussed barrier in each case. Respondents argued that MaaS business models that promote sustainable travel and are beneficial for different transport service providers are the cornerstone of MaaS' future success. This includes the division of roles and responsibilities among incumbent actors and new entrants. Several respondents noted the importance of one key factor linked to MaaS business models – costs associated with marketing new services (and brands) to increase visibility and attractiveness among potential users:

> If you want to create a sort of a global, or even a regional service, you would need to have a visible brand that you build on. That's a very...challenging game, because you need to create a lot of awareness among the users, you need to do a lot of marketing, and we saw that it's easy to get visibility with these kinds of things, but to really gain those customers and keep them, well that's a big challenge. – IP7 Finland

4.3. Micro-level conditions

Neither Swedish nor Finnish respondents professed much knowledge about end-users. Rather, respondents saw the need for further pilots to learn more about users' attitudes, preferences and behavior. In both cases, respondents debated whether or not potential users are ready to adopt MaaS. More skeptical respondents questioned whether current problems in the form of congestion, parking hassles and transportation costs are adequately significant to motivate a shift towards servitized solutions. They also claimed that mental models favor sticking to private car use, and that it is very difficult to compete with the 'mobility insurance' that owning a private car provides. Skeptical respondents argued that it will take a long time to change user preferences, and that Finland having the oldest car fleet in Europe is indicative of Finns' resistance

to change. In contrast, more optimistic respondents claimed that the private car is an ill-suited and costly solution to everyday mobility needs, which many users would rather be without. Further, these optimistic respondents mentioned that the penetration of smart phones; decreasing interest in driver's licenses among younger generations; and the general success of servitized businesses are good indicators of the readiness of the market.

5.   Discussion

Our study utilized the IRIMS framework to identify a set of institutional conditions that act as drivers and barriers of MaaS developments in Sweden and Finland (summarized in Table 2). A comparison of the two cases highlights structural differences that, when considered in terms of their historical importance, have led to different paths for MaaS in Sweden and Finland. It is interesting to note that MaaS developments in Sweden initially preceded those in Finland, yet one might reasonably argue that Finland has seen more tangible and recent MaaS-related action. Our analysis reveals several reasons for this. At the macro level, in Finland, the reformation of the Transport Code, combined with the development of a strong vision that is shared by a wider collective of key actors (MaaS champions) situated within key organizations in the public and private sectors, has been a strong enabler of MaaS development. The creation of a vision that identifies MaaS as a source of a new potential growth trajectory that unifies the ICT and transport sectors in Finland, in the context of a dire need for economic renewal, is supportive of these developments. Hence, we argue that the political climate (deregulation of the transport sector) and prevalent challenges (enabling growth within ICT and streamlining public spending to offset the economic downturn) have been successfully matched with the proposal (MaaS) in Finland, thus opening up the needed window of opportunity for policy change (cf. Kingdon 1989). In contrast, Sweden does not have the same need for economic renewal, as the economy has escaped the downturn relatively unscathed. Moreover, Sweden does not have a unifying vision for MaaS; nor does it have formal networks based on strong informal ties; and there is a lack of MaaS champions in key positions. Rather MaaS in Sweden is increasingly framed as a means to assist PT growth.

The difference in the underpinning rationales for MaaS in the two countries is arguably an effect of incumbent PT actors having a more front-seat role in the Swedish MaaS development, compared to the development in Finland. Naturally, PT actors are more focused on improving the existent PT regime and fulfilling incremental growth goals. This can be contrasted to start-ups, innovation agencies and government ministries who are keener on revolutionizing the transport sector and fulfilling visionary targets such as replacing the private car as the go-to solution for mobility. Notably, no representative of the incumbent PT actors was mentioned amongst the group of Finnish MaaS champions, and the Finnish PT sector has had little involvement in either the preparation of the Transport Code or the creation of the MaaS vision in Finland. Hence, one may anticipate that the Finnish development of MaaS might soon face similar disagreements regarding the roles of private and public actors, as has been the case in Sweden (where PT actors have been involved in the development of MaaS since the UbiGo pilot). For instance, although Whim was launched more than a year ago, MaaS Global is still to succeed in convincing HSL to provide more than (unsubsidized) single tickets. As a consequence, MaaS Global has not yet been able to go beyond offering Whim to a group of pilot users.

The two cases highlight a similar set of formal institutional barriers at the meso level. MaaS ecosystems, though emerging, are largely disjointed and there is an air of protectionism and risk aversion among transport service providers (particularly PTAs), resulting in an unwillingness to allow third parties to resell tickets, a lack of open data, and as a natural consequence, uncertainty regarding the viability of emergent MaaS

business models. In both cases, uncertainty regarding the size of the MaaS market and its potential is the result of a lack of knowledge regarding users and their willingness to adopt MaaS as a genuine alternative to private vehicle use.

	Formal		Informal	
Macro				
	The revised Transport Code (FI)	+	Optimistic shared vision (FI)	+
	The existing regulatory system (SE)	-	Lack of a shared vision (SE)	-
	Public funding of pilots (FI + SE)	+	Presence of MaaS champions (FI)	+
			Lack of MaaS champions (SE)	-
			Drive for economic renewal (FI)	+
			Drive for sustainability in transport (SE)	+
Meso				
	Lack of channels for ticket resales (FI + SE)	-	Cross-sector collaboration (FI)	+
	Lack of viable business models (FI + SE)	-	Public-private divide (SE)	-
	Lack of data & standards (FI + SE)	-	Risk aversion in ecosystem (FI + SE)	-
	Private investment (FI)	+	Informal networks among key actors (FI)	+
			Lack of trust and social capital (SE)	-
Micro				
			Uncertain market potential (FI + SE)	
			Existing user habits (FI + SE)	-
				-

Table 2. Summary of influential institutional arrangements (drivers denoted "+" and barriers "-")

5.1.   Practical implications

While our case studies reveal several conditions that are highly contextual, they can also be used to identify a set of generic institutional arrangements that influence MaaS development. That is, policymakers and practitioners with an interest in promoting MaaS developments should focus on the following:

1. Engaging a broad set of strategic and operational key stakeholders that have the mandate and discretion to govern MaaS within and beyond their own public/private sector organizations;

2. The creation of formal and informal networks based on geographical proximity to the centers of power and which are conducive to the creation of trust and social capital;

3. Creating a strong vision for MaaS that tackles sustainability problems in local/regional/national contexts;

4. Using and iteratively revising this vision to create a climate of open innovation within the MaaS ecosystem, where risks are translated into business opportunities for transport service providers;

5. Supporting pilots and implementations with financial capital from the public and private sectors;

6. Experimenting with new institutional arrangements (e.g. the redistribution of subsidies for PT) that are conducive to MaaS developments *and* sustainable travel behavior;

7. Learning as part of an interactive, co-creative process that aims to develop MaaS services and associated business models that are attractive to users.

These implications are not an exhaustive list; nor are they separate from one another. Rather, they should be seen as a set of interacting institutional arrangements that can be combined to support MaaS development. For example, the creation and iterative revision of an overarching vision for MaaS, based on the developments of services and incentives for sustainable travel behavior (i.e. shifts to more sustainable modes such as car sharing, PT, cycling and walking) may be key to overcoming protectionism and risk aversion among different types of transport service providers. That is, if it can be shown through pilots that MaaS will attract new users from the current private car segment, then transport service providers will likely see MaaS as an opportunity to attract new users rather than see their offerings and their brands as potentially cannibalized

by the collaborative approach that MaaS entails. It is indeed important to remember that the development and deployment of MaaS is not necessarily a goal in and of itself. Still, long-term commitments from PTAs that go beyond piloting might be needed in order to attract private investments. Hence developing MaaS offerings that *both* encourage environmentally sustainable changes to travel behavior *and* build upon viable business models may be key to unlocking the potential of the MaaS ecosystem.

The set of institutional drivers and barriers outlined in this paper occur at the macro, meso and micro levels, and despite linkages between these levels, it is clear that no single actor can govern a transition to a MaaS-based transport system in any given setting. Rather, our findings advocate a multi-stakeholder approach to governance, where networks of actors (MaaS champions) must act in concert to bring about the necessary institutional changes. Further, an understanding of institutions as consisting of both structures (legislation and policies, networks and roles, norms and culture) *and* practices (the creation of visions, experimentation, collaboration, changes in travel behavior) is required for effective governance, such that the development and diffusion of MaaS, as a radical innovation, must be seen as a process of institutional change. Hence in the next section we explicate a set of theoretical implications that may further inform practitioners.

5.2. Theoretical implications

From our analysis, it is clear that the IRIMS framework is useful for identifying the structural elements of institutions that influence MaaS development. However, one major shortcoming of IRIMS is that it obscures the practice-based elements of institutions, i.e. institutionalized roles, norms, behavior and cultural understandings that must change in order for MaaS to flourish. In order to give analyses of institutional effects practical utility, it is necessary to consider how a transition to MaaS may be governed, and a theoretical framework that includes both the structural and practice-based elements of change processes is required. To this end one may draw on the literature on institutional entrepreneurship (e.g. Battiliana et al., 2009) to examine how collectives bring about institutional change. Alternatively, one may draw insights from transition theory, and particularly transition management (Kemp and Loorbach, 2007a; Loorbach, 2010; Loorbach et al., 2010; Loorbach and Wijsman, 2013; Rotmans and Loorbach, 2008) Broadly, this framework espouses a long-term approach to sustainable transitions, based on strategic, tactical, operational and reflexive activities. *Strategic* activities are collaborative, multi-stakeholder processes, which aim to ensure that long-term visions are shared and embedded among collectives. In contrast, *tactical* activities serve to link individual actor strategies to the shared long-term visions created via strategic activities, aiming to overcome short-termism within different societal sectors (e.g. politics, business). They also aim to tackle the difficulties in implementing solutions by acknowledging complex sources of inertia within regimes, and directing activities such as corporate political action and lobbying towards the reformation of such structures. *Operational* activities aim to link everyday activities such as innovative experiments to long-term visions, broader policies and change agendas. *Reflexive* activities include the ongoing monitoring, assessment and evaluation of policies and practices as a means to revise overarching visions and plans where necessary (Kemp and Loorbach, 2007b; Loorbach, 2010, 2007; Rauschmayer et al., 2015; Rotmans and Loorbach, 2008; Voß et al., 2009). Our findings show that these types of practical activities are central to MaaS development. Theoretically, this implies that frameworks such as IRIMS can be further developed to include elements of practice that can, together with structural changes, bring about institutional change. Practically, one could draw on transition management by, for instance, anchoring the approach among the multiple stakeholders that are key to governing MaaS developments.

6.   Concluding remarks

Despite similar pioneering roles in relation to MaaS, developments have arguably progressed along different trajectories in Sweden and Finland. In Sweden, MaaS is primarily discussed as a tool for enhancing the attractiveness of servitized transport in order to meet growth goals for sustainable transport modes in general, and for PT in particular. In Finland, MaaS is rather seen as a new transport paradigm that can enable growth within ICT and streamline public spending to offset the economic downturn. As a consequence, Finnish developments have, until now, been more market-driven, compared to those in Sweden.

By analyzing and comparing MaaS in Sweden and Finland, we have identified a set of formal and informal institutional arrangements that enable and constrain MaaS development and deployment. The analysis illustrates that macro-level institutions (e.g. public funding of pilots) as well as meso- (e.g. risk aversion among key actors) and micro- (e.g. uncertain market potential) affect the prospect of developing viable MaaS offerings that contribute to societal goals. The analysis furthermore reveals differences (e.g. level of trust among stakeholders) and similarities (e.g. lack of data and standards) across the two cases.

Based on our findings, we suggest both practical and theoretical implications. For instance, on the practical level it is vital to engage a broad set of key stakeholders that have the mandate and discretion to govern MaaS within and beyond their own organizations, in order to promote the development of MaaS. This group should aim to create a concrete yet fluid shared vision for MaaS that tackles sustainability problems on both local and national levels. In order to create a vision that is both aligned with societal goals and with the goals of the key stakeholders in the emerging MaaS ecosystem, the group must include both stakeholders on strategic and operational levels of the transport sector, i.e. a mix of representatives for relevant governmental agencies and new entrants to the transport sector (e.g. MaaS start-ups) as well as incumbent public and private transport service providers. On the theoretical level, as practice-based *and* structural changes are needed in order to facilitate institutional change, *both* must be encompassed within applied analytical frameworks, e.g. IRIMS.

Lastly, the cases in this study are situated in a limited context in that they comprise a similar set of institutional arrangements. Further studies are needed in order to examine the influence of institutional arrangements in more divergent settings, for instance in countries where PT cannot serve as the backbone of personal urban mobility.

References

Andersson, M., Biding, T., Huusko, C., Svärdby-Bergman, A., Westman, F., and Åsman, P. 2014. "Nationell Strate-gi Och Handlingsplan För Användning Av ITS," Borlänge: Trafikverket. (https://www.trafikverket.se/tjanster/publika-tioner-och-styrande-dokument/).

Battilana, J., Leca, B., & Boxenbaum, E. (2009). 2 how actors change institutions: towards a theory of institutional entrepreneur-ship. *Academy of Management annals*, *3*(1), 65-107 (https://doi.org/10.1080/19416520903053598)

Boethius, O., and Arby, H. 2011. "Den Flexible Trafikanten - En Affärsmodell För En Samlad Mobilitetstjänst," Gothenburg.

Bokeberg, U., Persson, S., and Efraimsson, J. 2016. *Regionalt Trafikförsörjningsprogram För Västra Götaland - Programperiod 2017 - 2020 Med Långsiktig Utblick till 2035*, Västra Götalandsregionen - Avdelningen kollektivtrafik och infrastruktur. (http://www.vgregion.se/kollektivtrafik/).

Efraimsson, J. 2012. *Regionalt Trafikförsörjningsprogram För Västra Götaland*, Västra Götalandsregionen - Kollektivtrafiksekret-eriatet. (http://www.vgregion.se/kollektivtrafik/).

Frey, S. 2014. "Protokoll Från Kollektivtrafiknämnden, 2014-12-04," Västra Götalandsregionen - Kollektivtrafiknämnden, Decem-ber 4. (http://www.vgregion.se/politik/protokoll-och-handlingar/).

Grönlund, A. 2017. *The Swedish Doubling Project*, presented at the Thredbo15 - International Conference Series on Competi-tion and Ownership in Land Passenger Transport, Stockholm.

Gwilliam, K. 2008. "Bus Transport: Is There a Regulatory Cycle?," *Transportation Research Part A: Policy and Practice* (42:9), pp. 1183–1194.

Heikkilä, S. 2014. "Mobility as a Service-A Proposal for Action for the Public Administration, Case Helsinki," Master Thesis, Mas-ter Thesis, Aalto: Aalto University. (https://aaltodoc.aalto.fi/handle/123456789/13133).

Hellmann, M. 2014. "Finland's Capital Plans on Making Private-Car Ownership Obsolete in 10 Years," *Time*. (http://time.com/2974984/finland-helsinki-private-car-obsolete-environment-climate-change-transportation/).

Holmberg, P.-E., Collado, M., Sarasini, S., and Williander, M. 2015. "Mobility as a Service: Describing the Framework," Gothen-burg.

Jansson, K., and Wallin, B. 1991. "Deregulation of Public Transport in Sweden," *Journal of Transport Economics and Policy* (25:1), pp. 97–107.

K2020. 2009. "Kollektivtrafikprogram För Göteborgsregionen," K2020 – Framtidens kollektivtrafik i Göteborgsområdet, K2020 – Framtidens kollektivtrafik i Göteborgsområdet, Göteborgsregionens kommunalförbund. (grkom.se).

Kalander, L., and Haraldsson, R. 2017. "Förslag till Nationell Plan För Transportsystemet 2018–2029: Remissversion 2017-08-31," No. 2017:165, Borlänge: Trafikverket. (https://www.trafikverket.se/tjanster/publikationer-och-styrande-dokument/).

Kamargianni, M., Li, W., and Matyas, M. 2016. "A Comprehensive Review of 'Mobility as a Service' Systems," in *Transportation Research Board 95th Annual Meeting Compendium of Papers*.

Karlsson, I.C.M., Kronsell, A., Mukhtar-Landgren, D., Lund, E., Sarasini, S., Smith, G., Sochor, J., Wendle, B. 2017. "Mobili-ty-as-a-Service: A tentative framework for analysing institutional condition*"*. in *European Transport Conference 2017*, Barce-lona.

Kemp, R., and Loorbach, D. 2007a. "Transition Management as a Model for Managing Processes of Co-Evolution to-wards Sustainable Development Transition Management as a Model for Managing Processes of Co-Evolution to-wards Sustainable Development," *International Journal of Sustainable Development* (14:1), pp. 78–91. (https://doi.org/10.1080/13504500709469709).

Kemp, R., and Loorbach, D. 2007b. "Transition Management as a Model for Managing Processes of Co-Evolution to-wards Sustainable Development Transition Management as a Model for Managing Processes of Co-Evolution to-wards Sustainable Development," *International Journal of Sustainable Development* (14:1), pp. 78–91. (https://doi.org/10.1080/13504500709469709).

Khan, M. 2015. "How Sleepy Finland Could Tear Apart the Euro Project," *The Telegraph*. (http://www.telegraph.co.uk/finance/economics/11541657/How-sleepy-Finland-could-tear-apart-the-euro-project.html).

Kingdon, J. W. 1984. *Agendas, Alternatives, and Public Policies*, New York: Harper Collins.

Legerius, B. 2012. "Fördubblad Kollektivtrafik 2020, Resandeutveckling, Kostnader Och Trafikhuvudmännens Planer," PM, PM, Stockholm: SKL Sveriges kommuner och landsting.

Leviäkangas, P. 2016. "Digitalisation of Finland's Transport Sector," *Technology in Society* (47), pp. 1–15.

Loorbach, D. 2010. "Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework," *Governance* (23:1), pp. 161–183. (https://doi.org/10.1111/j.1468-0491.2009.01471.x).

Loorbach, D. A. 2007. *Transition Management: New Mode of Governance for Sustainable Development*, pp. 1–328. (https://doi.org/10.3141/2013-09).

Loorbach, D., van Bake, J. C., Whiteman, G., and Rotmans, J. 2010. "Business Strategies for Transitions towards Sustainable Systems," *Business Strategy and the Environment* (19:2), pp. 133–146. (https://doi.org/10.1002/bse.645).

Loorbach, D., and Wijsman, K. 2013. "Business Transition Management: Exploring a New Role for Business in Sustainability Transitions," *Journal of Cleaner Production* (45), Elsevier Ltd, pp. 20–28. (https://doi.org/10.1016/j.jclepro.2012.11.002).

LVM. 2009. "Finland's Strategy for Intelligent Transport," Programmes and strategies No. 6/2009, Programmes and strategies, Helsinki: Ministry of transport and communications. (https://www.lvm.fi/en/publications_series).

LVM. 2016a. "Taxi Services in the Transport Code," Fact sheet No. 20/2016, Fact sheet, Helsinki: Ministry of transport and com-munications, September 30. (https://www.lvm.fi/en/publications_series).

LVM. 2016b. "Public Transport in the Transport Code," Fact sheet No. 18/2016, Fact sheet, Helsinki: Ministry of transport and communications, September 20. (https://www.lvm.fi/en/publications_series).

LVM. 2017. "Liikennepalvelulain Toinen Vaihe Lausuntokierrokselle," Press release, Press release, Helsinki: Ministry of transport and communications, April 27. (https://www.lvm.fi/uusimmat-julkaisut).

MaaS Global. 2016. "Whim, the World's First All-Inclusive Mobility Service, Promises to Change Urban Travel Forever," *MaaS Global*, , June 13. (maas.global/whim-the-worlds-first-all-inclusive-mobility-service-promises-to-change-urban-travel-forever/, accessed September 4, 2017).

March, J. G., and Olsen, J. P. 1989. *Rediscovering Institutions*, Free Press. (https://www.google.com/books?hl=sv&lr=&id=Ppt-VLvIoSWwC&oi=fnd&pg=PR7&dq=JG+March+rediscovering+institutions&ots=nx1AtfAf21&sig=oWwNAI_TZYPr3rKNKk-B0I4g8oic).

Meyer, J. W., Boli, J., & Thomas, G. M. (1994). Ontology and Rationalization in the Western Cultural Account'. In W. Richard Scott & John W. Meyer (Eds.) *Institutional Environments and Organizations: Structural Complexity and Individualism*. Sage Publications.

Moore, J. F. 1996. *The Death of Competition : Leadership and Strategy in the Age of Business Ecosystems*, HarperBusiness.

Mukhtar-Landgren, D., Karlsson, M., Koglin, T., Kronsell, A., Lund, E., Sarasini, S., Smith, G., Sochor, J., and Wendle, B. 2016. "Institutional Conditions for Integrated Mobility Services (IMS): Towards a Framework for Analysis," *K2 Working Papers 2016: 16*, Lund, Sweden (http://www.k2centrum.se/publikationer).

Näringsdepartementet. 2017. *Andra Lägesrapporten: Nästa Generations Resor Och Transporter*. (http://www.regeringen.se/regeringens-politik/regeringens-strategiska-samverkansprogram/).

Palmbeck, J. 2016. "Trafikförvaltningens Strategiska Inriktning Avseende Kombinerade Mobilitetstjänster: Tjänsteutlåtande till Trafiknämnden," Stockholms Läns Landsting - Strategisk utveckling, December 28. (http://www.sll.se/politik/arenden-och-handlingar/).

Pernestål Brenden, A., Holmberg, P.-E., Smith, G., Laurell, A., and Kramers, A. 2017. "Kombinerad Mobilitet Som Tjänst I Sverige." (http://kompis.me).

Rauschmayer, F., Bauler, T., and Schäpke, N. 2015. "Towards a Thick Understanding of Sustainability Transitions — Linking Transition Management, Capabilities and Social Practices," *Ecological Economics* (109), Elsevier B.V., pp. 211–221. (https://doi.org/10.1016/j.ecolecon.2014.11.018).

Ringqvist, S. 2016. "Kollektivtrafikens Styrning Och Organisering: Utveckling Och Erfarenheter Av Okal Och Regional Kollektivtrafik 1970 - 2015," K2 Outreach No. 2016:11, K2 Outreach, Lund: K2 The Swedish Knowledge Centre for Public Transport. (http://www.k2centrum.se/publikationer).

Rotmans, J., and Loorbach, D. 2008. "Transition Management: Reflexive Steering of Societal Complexity through Searching, Learning and Experimenting," in *The Transition to Renewable Energy: Theory and Practice*, J. C. J. M. van den Bergh and F. R. Bruinsma (eds.), Cheltenham: Edward Elgar.

Samtrafiken. 2017. "Swedish Mobility Program (SMP)," Samtrafiken, January 31. (https://samtrafiken.se/projekt/swedish-mobility-program/).

Scott, W. R. 2013. *Institutions and Organizations: Ideas, Interests, and Identities*, Sage Publications.

Sipilä, J. 2015. "Finland, a Land of Solutions. Strategic Programme of Prime Minister Juha Sipilä's Government," Government Publications No. 12:2015, Government Publications, Prime Ministers Office, p. 29.

Smith, G., Sochor, J., and Karlsson, I. M. forthcoming. "Public-Private Innovation: Barriers in the Case of Mobility as a Service in West Sweden," *Manuscript*.

Smith, G., Sochor, J., and Karlsson, I. M. 2017a. "Mobility as a Service: Implications for Future Mainstream Public Transport," in *Thredbo15 - International Conference Series on Competition and Ownership in Land Passenger Transport*, Stockholm.

Smith, G., Sochor, J., and Karlsson, I. M. 2017b. "Procuring Mobility as a Service: Exploring Dialogues with Potential Bidders in West Sweden," in *24th World Congress on Intelligent Transport Systems*, Montreal.

Sochor, J., Karlsson, I. C. M., and Strömberg, H. 2016. "Trying Out Mobility as a Service: Experiences from a Field Trial and Implications for Understanding Demand," *Transportation Research Record: Journal of the Transportation Research Board* (2542), pp. 57–64. (https://doi.org/10.1109/EVER.2016.7476443).

Sochor, J., Strömberg, H., and Karlsson, I. C. M. 2014. "The Added Value of a New, Innovative Travel Service: Insights from the UbiGo Field Operational Test in Gothenburg, Sweden," in *International Conference on Mobility and Smart Cities*, Rome, October 27–28. (https://doi.org/10.1007/978-3-319-19743-2_26).

Sochor, J., Strömberg, H., and Karlsson, I. C. M. 2015a. "An Innovative Mobility Service to Facilitate Changes in Travel Behavior and Mode Choice," in *22nd ITS World Congress*, Bordeaux, France, pp. 5–9.

Sochor, J., Strömberg, H., and Karlsson, I. C. M. 2015b. "Implementing Mobility as a Service: Challenges in Integrating User, Commercial, and Societal Perspectives," *Transportation Research Record: Journal of the Transportation Research Board* (2536), pp. 1-9. (http://dx.doi.org/10.3141/2536-01).

Strömdahl, A., Arby, H., Kuschel, M., Karlsson, I. M., Billger, M., and Holmberg, P.-E. 2014. "Samverkansprojekt: Go:Smart," Vinnova. (http://www.mistraurbanfutures.org/sv/projekt/gosmart).

Transportstyrelsen. 2012. "Transportstyrelsens Föreskrifter Och Allmänna Råd Om Anmälningsskyldighet Och Trafikantinformation," *Svensk Författningsamling* (Vol. TSFS 2012:2). (https://www.transportstyrelsen.se/sv/Regler/ts-foreskrifter-i-nummerordning/2012/?RuleNumber=2012:2&RulePrefix=TSFS).

Tuominen, A., and Kanner, H. 2011. "Transport Revolution. International Perspectives," Helsinki: The ministry of transport and communications. (https://trid.trb.org/view.aspx?id=1126914).

Voß, J. P., Smith, A., and Grin, J. 2009. "Designing Long-Term Policy: Rethinking Transition Management," *Policy Sciences* (42:4), pp. 275–302. (https://doi.org/10.1007/s11077-009-9103-5).

Wile, R. 2014. "A 24-Year-Old Transport Engineer Is About To Free Her City From Car Ownership," *Business Insider*. (http://www.businessinsider.com/interview-with-helsinki-transport-engineer-2014-7?r=US&IR=T&IR=T).