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Institutional conditions for integrated mobility services (IMS)

Towards a framework for analysis

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Content

Preface

The theoretical framework presented in this working paper is developed as part of the Vinnova-financed project – **IRIMS I**nstitutional f**R**ameworks for **I**ntegrated **M**obility **S**ervices in future cities – which builds knowledge of and proposes recommendations for how institutional frameworks can be modified to enable new, integrated mobility services capable of contributing to a transition towards sustainable travel in tomorrow's cities. Integrated mobility services (IMS) are a way to approach mobility as a system where the traveller's transport needs are in focus and fulfilled by one service solution integrating different parts of the transport system – bus, train, carsharing, bikesharing, etc.

Cities are growing expansively as an increasing population travels to work, school and leisure activities. The growth of car travel in Europe challenges not only climate and sustainability goals, but also efforts to make cities liveable and attractive. In this regard, the need to decrease car use and shift to sustainable modes of transport is imminent. IMS are considered to be a potentially new way of thinking about transport that challenges car ownership and renders car use less attractive, thus providing an opportunity for decreasing automobility in cities. This project ties into these considerations and debates by asking under what institutional conditions IMS can develop. The point of departure for the IRIMS project is that there is a need to identify the institutional conditions influencing the establishment of this kind of service, including both potential barriers and enablers. This K2 working paper presents the theoretical framework for the **IRIMS** project.

Research on institutional challenges and opportunities in the mobility domain and insights from the development of new technologies and services are used to develop the framework for analysis. The framework is developed as a collaborative, multidisciplinary effort combining theoretical insights with field experience of services and technologies. It engages the project partners: Lund University, Lund University of Technology; Chalmers University of Technology, Gothenburg; Trivector; Viktoria Swedish ICT; Samtrafiken; and K2 Swedish Knowledge Center for Public Transport. With the help of the framework, the **IRIMS** project studies several cases of IMS that may come to dominate the future urban context in Sweden, and compares these with other European experiences. In terms of results, the project will generate scientifically based recommendations to be advanced in collaboration with relevant stakeholders about the conditions for IMS.

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Sammanfattning

Föreliggande text är ett teoretiskt ramverk som är framtaget med syftet att generera kunskap om och policyrekommendationer för institutionella ramverk som främjar integrerade mobilitetstjänster (IMS *Integrated Mobility Services*). Integrerade mobilitetstjänster är tjänster där resenärens transportbehov uppfylls av en tjänst som kopplar ihop och integrerar olika (privata och offentliga) mobilitetstjänster genom tillhandahållandet av *ett* gemensamt gränssnitt. Den här typen av tjänster är under utarbetning i flera städer globalt, och vi intresserar oss för hur institutioner kan möjliggöra men också hindra dess realisering. Institutioner definieras som en stabil samling regler och praktiker som är inbäddade i strukturer som möjliggör handling. I projektet tillämpas en bred teoretisk ansats som är framtagen av ett tvärvetenskapligt forskarteam, och som inkluderar faktorer på såväl makro, meso och mikro nivå, det vill säga från omfattande samhällsförändringar till individens behov och agerande. Makronivån omfattar bredare samhälleliga och politiska faktorer inkluderande såväl formella regler som mer informella samhällsnormer, trender och uppfattningar. Uppdelningen mellan formella och informella variabler återkommer även på meso, respektive mikronivå. På mesonivån – som inkluderar såväl privata som offentliga aktörer på regional och lokal nivå – utgörs institutioner av dels formella faktorer som skatter och föreskrifter, dels informella faktorer såsom organisationskultur och nedärvda mönster för samarbete mellan regionala aktörer. Varje aktör går in i de samverkansprocesser som rör IMS med sina egna ideal, intressen och förväntningar, och det är i dessa förhandlingsprocesser som ramverket tar sin utgångspunkt. Det är också i denna samverkanskontext som affärsmodeller ska arbetas fram. Slutligen inkluderar ramverket också mikronivån, där ett individperspektiv anläggs. Individen påverkas i sin vardag av olika formella incitament och pådrivande faktorer, men hon styrs också av informella aspekter såsom självbild och social status. Med hjälp av detta analysverktyg identifieras institutionella hinder respektive möjliggörare för utvecklingen av integrerade transporttjänster så att rekommendationer som vilar på vetenskaplig grund kan tas fram. Projektet realiseras genom fallstudier av nya integrerade mobilitetstjänster som på sikt kan komma att prägla framtidens urbana kontext.

Summary

The present text is a theoretical framework that has been developed with the aim to generate knowledge of and policy recommendations for the promotion of integrated mobility services (IMS), with specific regard to institutional dimensions. Integrated mobility services are services where the passenger's transport needs are met by a service that not only integrates a range of mobility services, both public and private, but also provides one-stop access to all services through a common interface. These types of services are currently being developed in several cities globally, and the purpose of the project is to understand and explain how institutions can enable, but also impede, their realization. Institutions are defined as a relatively stable collection of rules and practices, embedded in structures that enable action. In the project a broad theoretical approach, developed by an interdisciplinary research team, will be applied. As such, the framework includes factors at the macro, meso and micro levels, thus including extensive societal trends as well as individual's needs and behaviour. The macro level includes broader social and political factors, including both formal rules and more informal social norms and perceptions. The division between formal and informal variables recur on the meso and micro levels respectively. The meso level – which includes both public and private actors at regional and local levels – consists of both formal institutional factors such as taxation and regulations, and informal factors such as organizational culture and inherited networks between regional actors. Each actor enters the collaborative processes that signify IMS with their own ideals, interests and expectations, and it is in these processes of negotiation that the framework takes it point of departure. It is also in this context that business models will be developed, another central aspect of the realisation of IMS. Finally, the framework also includes the micro level, where an individual perspective is placed at centre stage. Individuals are affected by various formal incentives and push factors, as well as more informal aspects such as self-image and social status. Through the application of the framework in a number of case studies, empirical findings will help illuminate which institutional factors enable or constrain the development of IMS. The findings will provide the empirical and analytical foundation for suggestions on how formal and informal rules and practices can be modified to enable new IMS to contribute to sustainable mobility.

1. Introduction

Cities are growing expansively as an increasing population travels to work, school and leisure activities. It is expected that car travel will increase in Sweden by 25% by 2030 (Trafikverket 2016:19) and this challenges climate and sustainability goals as well as ambitions to create attractive and liveable cities. To achieve such goals it is necessary to decrease car use and shift to sustainable modes of transport. In this context, integrated mobility services (IMS) are described as a new paradigm making private car ownership and use less attractive. The project task is not to evaluate the sustainability or climate effects of IMS but to ask under what conditions IMS can be developed. IMS provide a way to approach mobility as a system where the traveller's transport needs are in focus and fulfilled by a solution integrating different parts of the transport system – bus, train, carsharing, bikesharing, etc. – into one service. There is a need for knowledge about the conditions for IMS to become viable solutions. Thus, the point of departure for this project is to identify institutional barriers and enablers influencing the establishment of this kind of service.

The project focuses on institutional conditions for IMS and suggests that institutional factors can constrain but also enable their development. The main question is *how, and to what extent, do existing institutional factors affect service development of IMS in the field of urban transport?* The project's ultimate aim is to provide suggestions for how institutions can be modified to enable new IMS to contribute to sustainable mobility. By institutional factors we mean a collection of relatively stable formal and informal rules and practices. Our choice to zoom in on institutional factors is motivated by their absence in policy development or overall strategies and programmes where institutions often are regarded as a "given" condition, or reduced to a static constraint or enabler. As a consequence, there is insufficient knowledge on the relevance and inherent diversity and complexity of institutions.

The aim of this working paper is to develop a framework for analysis. A theoretical framework is an intellectual tool developed and used by researchers to identify, sort, prioritize and interpret empirical data in a systematic and transparent way. We take advantage of different perspectives of the interdisciplinary team and have opted for an analytical framework that casts a wide net to capture a broad set of institutional factors that may provide opportunities or obstacles for the development of IMS. As a consequence of this choice, we argue that more or less stable rules and practices can be found at different levels – macro, meso and micro – as well as in different forms. Our framework provides a kind of broad prism used to identify and assess institutional barriers and enablers for the development of IMS.

The analytical framework starts in institutional theory – a broad theoretical tradition that has been developed to understand and/or explain *organisational* as well as *individual* action (Dacin et al 2002). Institutional theory defines institutions broadly; ranging from societal regulations, planning processes, and consumption patterns, to individual habits and practices. Furthermore, these processes are found at various levels: the *macro* level includes the national level where national visions, action plans and goals (which may or may not be derived from the EU European Union), as well as legislation, subsidies and taxes are generated. The *meso* level includes a variety of institutions; public institutions on the regional and local levels, private organisations, public/private hybrids and not-for-profit civil society actors. We have identified collaboration and business models as two aspects that are particularly relevant to understand actors' motives and relationships at the meso level. Finally the *micro* level includes the individual in her capacity as citizen, as taxpayer, but primarily as customer and user of IMS.

The paper is structured in the following way, in the next section the concept IMS is discussed and related to adjacent concepts such as Mobility as a Service (MaaS) and shared mobility. Thereafter, the ideas about institutional obstacles and opportunities are laid out and explained on the macro, meso and micro levels respectively and summarized in a model, while the final and third section briefly outlines the research to be conducted applying the framework.

2. Integrated Mobility Services – a conceptual exploration

Services that integrate different transport modalities have as their objective to provide customers access to seamless mobility without having to own a car.[1] Such services also offer to deal with problems such as urban congestion, transport-related pollution and accessibility through combining different transportation modes (e.g. public transport, carsharing and bikesharing, taxis, walking, etc.) in a manner that enables multimodal travel and increases vehicle utilisation rates and vehicle occupancy. The potential of this kind of service has attracted a lot of attention and resulted in a plethora of concepts used to describe it, albeit not always accompanied by succinct definitions. In the following we explore a few of these concepts as a way to advance understanding on IMS, what it is and what it is not, and explain why we have opted for the concept IMS.

One of the most frequently used terms in the literature is *Mobility as a Service* (MaaS), which has been promoted by the Finnish innovation agency Tekes (Heikkilä 2015). There is even a MaaS Alliance of 20 European organisations active on the topic, which defines the concept as follows:

> *"The key concept behind MaaS is to put the users, both travellers and goods, at the core of transport services, offering them tailor made mobility solutions based on their individual needs. This means that, for the first time, easy access to the most appropriate transport mode or service will be included in a bundle of flexible travel service options for end users."*[2]

However, Mobility as a Service is a rather broad concept that theoretically could refer to all kinds of mobility services, also single-mode services such as carsharing or Uber, although some also use the term in a narrower sense. One important dimension for discerning what is unique with the services and which we wish to study in this project is the multimodality of the service offer. Spickermann et al. (2014) use the term "*multimodal mobility*" to describe how different transport modes, both public and private, are combined. What is lacking here is the service component. If I ride my own bike from home to the railway station, take the train and then get a taxi from the railway station to my final destination I have made a multimodal journey, but I have not used a multimodal mobility service until there is a service provided that puts these different parts together for me into one offer.

"*Shared mobility*"[3] is another related concept, which is used to connote a range of different transport modes that are shared between users, such as carsharing, bikesharing and sometimes also public transport. These modes complement each other and are the backbone of any integrated mobility service offering, but the term "shared mobility" does not in itself imply that they are combined.

Following Sochor et al. (2015), we adopt the term "*integrated mobility service*" (IMS) to describe a service that not only integrates a range of mobility services, both public and private, but also provides one-stop access to all services through a common interface (hence creating a seamless customer experience, i.e. the service). The service component could be more or less developed, ranging from simply the possibility to find travel information and pay for different mobility services within one technical system, to providing more far-reaching mobility service offers such as subscriptions to different mobility packages, perhaps also involving other service components such as goods delivery or bicycle repair services.

IMS can further be characterised as a servitised transport offering, and as such is an example of a servitised business model where the offering is provided as a service rather than a product (Tukker 2004; Mont 2002), whereby providers and users "agree on an end result without specifying how the result is

1 Integrated mobility does not, however, dictate that private car ownership should be eradicated. On the contrary, private ownership can play a significant role given the emergence of peer-to-peer services such as Uber, which can in principle play a significant role in IMS systems. Rather, integrated mobility implies a more effective use of cars.
2 http://maas-alliance.eu/
3 http://www.carplus.org.uk/what-is-shared-mobility/door-to-door/

delivered" (Williams 2007: 1098). This means that a traveller can utilise multiple transport modes available via an IMS in order to travel from one location to another.

IMS business models require new business ecosystems. Moore (1996: 3) defines the latter as follows:

> *"An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies".*

An IMS business ecosystem serves to bundle service offerings provided by separate transport actors as part of a single, multimodal offer that is accessed by users via mobile applications (Holmberg et al. 2016). The system includes an ICT platform that facilitates bookings, payments and revenue distribution and is delivered to end users via an IMS service provider. It may also include other functionalities such as data analytics and supplementary services.

3. Understanding institutional obstacles and opportunities

To understand the obstacles and opportunities for policies, programs and projects in the multilevel collaborative context that characterises IMS, we draw upon insights from neo-institutional theory. Following March and Olsen, institutions are broadly understood as "a relatively stable collection of rules and practices, embedded in structures of resources that make action possible" (1989). This definition is further developed in Richard Scott's (2014) conceptualisation where

> *[…] institutions comprise of "regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life" (Scott 2014: 56).*

In brief, (i) regulative refers to rules and sanctioning activities that are formal and explicit, (ii) normative features are values and norms, and (iii) cognitive aspects are those categories and conceptualisations through which identities and meanings are constantly interpreted and re-interpreted (Thornton et al 2012: 36; Scott 2014: chp 3). Institutional obstacles and opportunities are thus not restricted to formal features. Informal aspects, including identity and perceived roles, meaning making stories about the institutions, daily habits and practices, are on the contrary highly relevant (March and Olsen 2006: 691; cf. Niemann 2013). For March and Olsen (1989) this entails that institutional behaviour is guided by what they described as *the logic of appropriateness,* or in other words policy making is initiated and implemented in line with what appears appropriate, i.e. seems to fit with and into the institution. In relation to the concepts above, action is deemed most likely when it fits and relates to the regulative, normative and cognitive features that "guide behaviour and resist change" (Scott 2014: 57). In our framework we refer to regulative aspects as *formal*, and normative and cognitive features as *informal* features that are embedded in institutions. Even though the distinction between the two is mainly analytical, the conceptual pair formal/informal will be applied in the continued analysis.

Although neo-institutionalist theory tends to emphasize continuity rather than change, we consider the role of institutions as being both enabling and constraining. This means that action is possible – but constrained – by the institutional environment. An example of how institutions can be constraining is that organisations, rather than adapting to reforms, tend to change the reform to make it "fit in" to the already existing institution (Hall 2012: 79; cf. Scott 2014: 57).

To pinpoint what are enabling versus constraining factors seems to be key in order to come to grips with the conditions for changing mobility patterns. To understand the conditions for IMS in relation to formal and informal features we need to ask how action is possible. Here, Scott (2014) and other institutional scholars (cf. Niemann 2013; Paulsen 2007) point to the possibility that actors take on different, often multifaceted roles in policy making. A role can be a professional identity, for instance a public transport provider, a car rental company or a transport policy maker. To act according to *a logic of appropriateness* means that actors do "what they see as appropriate for themselves in a specific type of situation" (March and Olsen 2015: 1). In other words actors follow rules and adhere to values and norms because they perceive them as rightful, expected and legitimate, and as such they fulfil obligations encapsulated in a role. What is considered appropriate relates to the ethos, practices and expectations that are deemed meaningful in relation to the role, and that are expressed through formal but also informal dimensions of institutions (i.e. legislation, professional ethics but also organisational culture). The logic of appropriateness gives stability and predictability but also tends to make institutions sticky and difficult to change at least in radical ways. Indeed, neo-institutional theory emphasizes continuity. However, we know that institutions do change and develop, and we know that there are different degrees of local adaptability to reforms, emphasizing the dynamic and contextual features of institutions (cf. Hall 2012: 77). Thus, the framework will recognize that institutions are constraining but also enabling.

As the aim of the framework is to *identify* specific institutional obstacles and enablers, an approach that takes on different levels of analysis – while still analytically separating them – will be useful in order to sketch out the critical points and processes. In an empirical perspective this broad understanding of institutional actors includes a diversity of features encompassing both the symbolic systems (i.e. norms and beliefs) and the material dimensions (i.e. rules and resources) of institutions. In any given process all these dimensions are intertwined – institutions are after all only brought to life in "actual human conduct." (Scott 2014: 57, partly quoting Berger and Luckmann 1967). The theoretical framework includes both formal and informal dimensions of institutions. To make a distinction between the formal and the informal is already challenging, and to further distinguish different informal features (i.e. norms, beliefs, values, culture etc.) can be baffling. In this regard, our theoretical framework will attempt to analytically separate different institutional levels (macro, meso and micro) and their respective formal and informal dimensions while simultaneously paying attention to differences within them in order not to mask what may be important differences between them. As a result, the framework will include a number of analytical dimensions, but in the spirit of Scott, "[…] more progress will be made […] by distinguishing among the several component elements and identifying their different underlying assumptions, mechanisms and indicators" (Scott 2014: 59). In the following section the formal and informal institutional aspects of the framework will be described and related to the general empirical context; later they will be specified further and related to the development of IMS on the macro, meso and micro levels.

3.1. The formal dimensions of institutions

The formal dimensions of institutions include the capacity to establish and determine rules and "inspect conformity to them" (Scott 2014: 59). Rules and regulations are of course a central part of all types of governing, and they can vary from highly regulated rules or laws, to more vague forms of governing in terms of visionary plans and local or regional goal documents. Our understanding of the formal dimensions of institutions is situated in on-going debates on shifts in local, regional and national governing, more specifically the transition from governing to (multilevel) governance as well as new forms of governing and management within the frame of public administration. Governance studies emphasize the complexity that comes with interactions between different public and private actors in more or less self-regulating (sometimes temporary) networks (cf. Kooiman 2003; Hedlund & Montin 2009) in a multilevel context (cf. Scharpf 1997; Hooghe & Marks 2001). In this regard, governance theory can aid the understanding of the complex webs that we study. Within the frame of public administration, New Public Management (NPM) theory brings issues such as changing tools and instruments in public administration to the fore. NPM can be seen as a label for a number of interrelated processes such as increased use of auditing, outsourcing and procurement as well as increasing autonomy for civil servants (Pollitt & Bouckaert 2011; Hood 1995). Together these changes imply that the incidence of formal governing through rules and sanctions has increasingly been complemented with multilevel interactive forms of governance. This is not to say that the role of the state has diminished, but rather that the forms of government are shifting as formal rules and regulations co-exist with other forms of governing and coordination, along with an increasing dependence on private actors in all stages of the policy process, from initiation to implementation and evaluation (Pierre och Sundström 2009: chp 1; Hultén 2012). Further, the conditions for governing are also changing in the light of increasing interdependence, EU membership as well as the deregulation of parts of the transport system. In addition, we are also witnessing an increasing emergence of cross-sectoral cooperation structures, partnerships or networks, sometimes described as an overall transition from a society based on hierarchy to a network-based society (Torfing et al. 2012; Pierre & Sundström 2009). In this context our understanding of what is regulative is widened in order to reflect this diversity in forms of governing; and besides formal rules and sanctions, this pillar includes national action plans/visions/scenarios, material produced by state agencies, but also state subsidies and access

to financial resources in terms of funding from for example innovation agencies at the national and EU levels.

3.2. The informal dimensions of institutions

As mentioned above, the informal dimension of institutions are particularly relevant in relation to the logic of appropriateness, where what is considered appropriate conduct is guided by formal and informal features, values, norms, and shared conceptions, often within roles (March and Olsen 1989). This way individual action in institutions is considered a process of interpreting and making meaning of formal as well as informal dimensions of institutions. This dimension encompasses values, norms and cognitive aspects. Values are defined as "conceptions of the preferred or the desirable together with the construction of standards to which existing structures or behaviours can be compared and assessed" (Scott 2014: 64f). Norms are described as specifying "how things should be done" as well as "legitimate means to pursue valued ends" (Scott 2014: 64f). In this regard normative systems define objectives, such as 'making a profit' for companies, 'acting in the general interest of citizens' for municipalities, 'reducing carbon emissions' for the transport authority, or 'choosing sustainable means of transport' for an individual. In other words the informal dimension includes both a conception of what we should do and how we should do it (including standard procedures for getting it done). These shared norms and values can encompass all actors in a specific context, but they can also be attributed to specific roles, such as the bureaucratic ethos of a civil servant. In this context, the informal dimension not only encompasses joint values and norms, but also cognitive features relating to identity and self image both on the level of the organisation (e.g. the company or the municipality), and on the level of the individual as stakeholder, citizen, customer and/or user. It includes organisational and corporate culture ('how we do things at our organisation'; 'this is our brand') and gives the context in which the professional role is enacted and action becomes meaningful. Understandings can also be shared in a community, for instance in regards to driving your children to school. In relation to the context within which this paper is written, such shared understandings can be found in the broader social context, such as the emergence of a 'new transport paradigm' and the centrality and importance of mobility (Essebo 2013), but also buzz-words such as social innovation and shared economy. These understandings can be shared on the EU level, the local level, or on an organisational level, and as such they affect the actions of individuals acting within or in interaction with these institutions as they relate to "shared conceptions that constitute the nature of social reality and create the frames through which meaning is made" (Scott 2014: 67). In a similar sense, different organisations can emphasize different values in a collaborative process, while still striving for the same goal.

3.3. Collaboration

This study is situated in a governance field constituted by a number of different public and private actors and stakeholders. In the field of transport a number of important institutional changes have led to an increasing need to collaborate, such as increased deregulation, privatization and the introduction of different elements of competition, as well as increasing differentiation in regards to ownership and operational responsibility (Hrelja el al. 2016: 8). In this regard, the resources and expertise of both public and private actors must be pooled, and processes need to include relevant stakeholders (including citizens and potential users) early in the process. Beyond these overall institutional changes, the field of transport is engaged with challenges in relation to integrating different modes of transport. Integration of transport systems involves the potential to connect different forms of transport, while the institutional concerns are about collaboration between different (public and/or private) actors on the local, regional and state levels. In particular, the literature on multimodal mobility services suggests that collaboration is critical to the development and implementation of IMS. For example:

> *"The main prerequisite for successful future urban mobility will entail customer-oriented collaborations, comprising traditionally independent infrastructure*

> *subsystems and the public sector […] The multimodal mobility market will be controlled by corporations that provide and understand mobility as a service […] The mere production of infrastructure and transportation means will cumulatively play a minor role" (Spickermann et al. 2014: 211).*

Collaboration is thus both a broader institutional feature within the transport area, and an intrinsic characteristic in relation to IMS. In this framework on IMS we see collaboration as a *process* where (i) various stakeholders from different public, private (and/or public/private hybrids) as well as civil society organizations 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 (cf. Vangen et al 2014; Provan & Kenis 2007; Ansell & Gash 2008). The purpose of collaboration can, in its most simplified sense, be said to aim to attain goals that go "beyond the capabilities of organizations acting alone" (Vangen et al 2014: 3).

4. Analytical Framework

The previous section presented the general features of the institutional approach used in the framework and its formal and informal dimensions. In this section, these dimensions are related to three analytical levels: macro, meso and micro. We argue that all levels may hold institutional obstacles and opportunities that have relevance for grasping the conditions of IMS. The *macro* level includes political and societal institutions on the national and international levels. The *meso* level is that which falls in between macro and micro, and usually refers to the analysis of organizations and communities, including collaborative networks. In the case of IMS, it includes a variety of institutions: private, public (regional and local) organisations, public/private hybrids, civil society organizations and other NGOs. In the case of IMS, business models and theories on collaboration are particularly relevant to understand actors' motives and relationships and exemplify a meso-level analysis. The *micro* level zooms in on the individual in her capacity as citizen, as taxpayer, but in particular as customer and user of IMS and the formal and informal rules and practices that play a key role in a change towards more sustainable transport. In the following, the formal and informal dimensions of institutions will be specified further in relation to the macro, meso and micro levels, resulting in a generic framework for the analysis of institutional obstacles and enablers in collaborative efforts when developing and implementing IMS. Each analytical level and dimension ends with a research question to be applied in the empirical analysis.

4.1. Macro level

The macro-level analysis focuses on the larger social scale and assumes that what happens in political and social institutions may have impacts significant for IMS. Put differently, the macro level is the umbrella dimension under which the meso and micro level operate and deal with the societal prerequisites that influence the outcome and experience of mobility services. The macro level provides the legal framework for what municipalities and cities are allowed to do and not to do, but the macro level also encompasses societal aspects such as culture and politics, which can affect the potential, development and outcome of IMS. In this context it is also important to keep in mind that policy processes within the transport field are characterized by conflicts of interest, negotiations and power relations (cf. Hultén 2012: 17). In our framework the macro level is more than simply a context, as we aim to differentiate specific features at the macro level that influence the conditions for IMS. Relevant macro level institutions could be national and regional governments and their administrations, mass media or civil and social organisations with a broad constituency. Moreover, the macro level deals with higher geographical scales: the national scale and the EU scale. The macro level includes both formal and informal dimensions.

- ***Which larger social, political and legal institutions are relevant for the development and implementation of IMS?***

4.1.1. Formal dimension

Laws, rules, taxes, subsidies and financing are examples of means by which macro-level institutions guide action. Through these means the development and implementation of integrated mobility services can be supported or hindered. From a national perspective, relevant laws in the Swedish context may be the Environmental Code, the Public Transport Act or laws regulating business, but also directives or policy guidelines issued by the European Union (such as the EU procurement directive). Regulative acts are stable and difficult to reverse. IMS can be helped by regulative acts that aim towards sustainable mobility (Urry 2004; North 1990). Taxes and subsidies can have a large impact on the financing of IMS systems, which also affects how these services and systems can develop for example in terms of business models. The allocation of financial resources, for example through the Swedish Research Institute Vinnova, but also funding actors on the EU level, can also be decisive for experimental phases of IMS.

- ***How do formal macro-level institutions influence the development and implementation of IMS?***

4.1.2. Informal dimension

The informal dimension includes shared values, norms, and visions of future development, identity, self-image and goals for transport. In the Swedish case for example, the vision about the development of Sweden 2025 (Boverket 2012) and the framework for climate politics (SOU 2016: 21) can inspire and guide long-term public goals, including indications of the possible place for IMS in the future. Visions developed by the European Union, such as "Cities of tomorrow – Challenges, visions, ways forward" (European Union 2011) can also gain influence in this regard. Broader media debates and campaigns in civil society may also be influential here.

Cognitive aspects deal with shared understandings or perceptions on the macro level and how these could affect the development and use of mobility services. These issues include sustainability, innovation, accessibility and the shared economy. In recent years, carsharing, bikesharing and similar services have become more and more popular. Broad societal acceptance could mean that the shared economy has influenced peoples' behaviour and thus the perception of IMS. From a national or European perspective this can be encouraged and affected through different political goals that guide how municipalities can act when developing IMS. Moreover, forms of path dependence can have both a negative and a positive impact on the development of IMS. One example is automobility, where a private car has often been seen as a necessity for urban life, thus creating mental barriers limiting thinking beyond ownership (Urry 2004; Sheller & Urry 2000). Similar tendencies have been observed when it comes to cycling or why people use the bicycle as a mode or transport or not (Koglin and Rye 2014).

- ***How do informal macro-level institutions influence the development and implementation of IMS?***

4.2. Meso level

The *meso* level includes a variety of institutions: private, regional and local public, public/private hybrids and civil society organisations. IMS can be initiated as well implemented by public and/or private actors, but most likely they will be developed in collaborative efforts between different actors on this level. A range of actors from the public, private and third sectors have previously developed shared mobility initiatives such as bike- and carsharing (DeMaio 2009; Shaheen et al. 2010). Yet at present, it is not clear which type of actor will take responsibility for developing IMS systems and adopt the role of IMS service provider. Weber et al. (2014; see also Holmberg et al. 2016) note that public sector leadership in the development and implementation of IMS can be crucial for initial success, but also that private sector experimentation can result in the development of 'non conventional' (i.e. more innovative) services. Moreover, IMS require new business models[4] that contain a business ecosystem and an associated network of actors that are involved through collaborative efforts. Below we identify a generic set of potential barriers and enablers related to IMS at the meso level.

4 A business model is a device for creating and capturing value and for delivering that value to customers (Zott et al. 2011; Chesbrough 2010; Teece 2010; Zott and Amit 2010; Osterwalder and Pigneur 2009; Johnson et al. 2008). It consists of a value proposition (i.e. a product or service that is offered to customers), a customer interface, supply chain relationships, a financial model (i.e. a cost and revenue structure that distributes benefits across business model stakeholders) a network of partners, distribution channels and other key resources and processes (Bocken et al. 2014; Zott et al. 2011; Johnson et al. 2008; Ostervalder 2004).

- ***How do institutions influence the formation of IMS business ecosystems and associated networks?***

4.2.1. Formal dimension

The formal dimension includes policies and regulations that are implemented by governments, administrative bodies and public transport authorities at regional and local levels. For example, regional governments in Sweden commonly decide on traffic supply programs, which set goals for regional public transport development and guide infrastructure investments. Thus, such policy documents drive (and constrain) the focus and scope of public transport agencies' activities. The public transport agencies can then, in turn, influence the conditions for development and implementation of IMS applications by choosing which collaborations and projects they engage in and what they offer partners and suppliers using procurements and contracts as key instruments. A key issue in relation to IMS applications is, for example how the business risk is divided and whether third-party actors are permitted to wholesale public transport tickets. Regional and local governments can moreover affect the innovation climate through for instance offering different types of business grants, or by investing in public resources such as digital platforms. They can also impact the attractiveness of IMS applications indirectly through for instance urban planning and design, and directly through economic incentives such as fare subsidies, congestion charges and parking regulations.

- ***How do formal regulative elements and contracts influence the formation of IMS business ecosystems and the way in which IMS function?***

4.2.2. Informal dimension

Since IMS require new forms of collaboration and partnerships between actors that have not traditionally worked together, one factor that comes into play is that of institutionalised roles. The formation of IMS ecosystems will likely warrant the renegotiation of existing and well-entrenched roles. Public transport operators, for instance, may aim to provide comprehensive coverage and accessibility given their role as a provider of public services, and may also see their role as important for the sustainability of the transport system. In contrast, commercially driven transport service providers are more likely to focus on boosting profits and increasing market shares. Hence the formation of IMS ecosystems could give rise to debates between different stakeholders regarding the goals and aims of IMS initiatives, especially where trade-offs exist between these (e.g. social sustainability vs. commercial potential). On the contrary, IMS may gain support from public actors who see it as an institutional opportunity to create sustainable, attractive cities.

The actors within an IMS ecosystem are organisations that are subject to institutional barriers to change that may be grouped as cognitive sources of inertia. Core rigidities (i.e. established capabilities that can inhibit innovation) are one such example (Leonard-Barton 1992), and are particularly relevant in the field of disruptive innovation. Another example is that of existing business models, whose logical component (i.e. 'how we do business') structures sense-making activities and can prevent organisations from recognising new opportunities altogether. A further example is the relative absence of an entrepreneurial mindset, which can be expected in institutions and organisations that are not accustomed to implementing novel ideas and inventions (e.g. public sector organisations with a strict bureaucratic culture). The novelty of IMS implies that these types of cognitive barriers may arise within organisations across the entire business ecosystem.

- ***How do institutionalised roles and cognitive sources of inertia influence the formation of IMS business ecosystems and the development of IMS business models?***

4.3. Micro level

The micro level refers to the level of the individual. Individuals act in different capacities and have different roles – they are citizens with democratic rights (participation, accountability) and they are taxpayers (contributing to, for example subsidising public transport). The individual as a citizen is often visible in instances of either raising demands towards the municipality/region, or criticizing it (e.g. demands for public transportation, or in the critique of politicians 'wasting tax-money'). Individuals as voters are included as democratic participators in deliberative planning processes, and give feedback to decision-makers in terms of users of the urban landscape. The individual also figures in the rhetoric of political decision-makers, who motivate efforts with reference not only to values such as sustainability, but also in regard to the perceived needs and wants of citizens. In these roles, individuals may play a role in creating obstacles or facilitating the development and dissemination of IMS on macro and meso levels. However, individuals are also paying customers of a number of services, as well as users of the same services. On a micro level, the framework will focus on the individual as a customer and user of IMS but in the analysis other roles mentioned will also be kept in mind.

- ***How do individuals, in their different roles, relate to the idea of IMS?***

4.3.1. Formal dimension

A number of regulative factors specifically targets individuals' travel behaviour including the choice of transport mode, most often with a focus on the private, petrol-fuelled car. There are 'push measures' intended to make certain transport solutions relatively less attractive or even prohibited. Examples include economic disincentives, such as taxation of cars and/or fuel and road or congestion pricing. Reducing the number of parking places or prohibiting car traffic in city centres are other types of disincentives that can be initiated on the macro or meso level. Other regulative factors can be categorised as 'pull measures', intended to make other transport solutions relatively more attractive, such as subsidising investments in, for instance, electric vehicles and reducing the cost for different means of collective transport. Depending upon the decisions taken, policies can thus 'push' or 'pull' individual travellers to shift from, for instance, private car use to becoming customers and users of IMS.

- ***What are the formal push and pull measures for IMS on an individual level?***
- ***How do they work to change individual transport behaviour?***

4.3.2. Informal dimension

Subjective norms play an important role in determining individual transport behaviour (e.g. Verplanken et al., 1998; Bamberg and Schmidt, 2003). Taking an individual's subjective norm into consideration, the individual may for instance experience more or less pressure to use a certain transport solution depending upon the individual's perception of the extent to which others would approve or disapprove of the choice made. The car has often been described as 'the norm' but in a certain social context an individual may feel that driving to/from work is not approved of, whereas in another context, typically when establishing a family, investing in a private car could be 'the thing to do'.

Also self-image and social status are aspects that are considered to influence individual travellers' choice of transport solutions. As mentioned above, the private car has been described as a status symbol, representing freedom, efficiency, and financial success (e.g. Dittmar 1992; Hiscock et al. 2002; Steg 2005) whereas other modes of transport, such as public transport or the bicycle, have been associated with low(er) status. However, investigations indicate an overall rise in public transport use

(Transport Analysis 2015; UITP, 2014); the number of public bike schemes is increasing (e.g. Fishman, 2016) and at least in certain communities the image of car ownership appears to be changing from convenience and freedom to hassle and burden, why services such as carsharing schemes are considered as an attractive solution providing access to a car when needed. Thus, current societal shifts in a more environmentally conscious direction, and the trends towards joint or shared ownership or no ownership at all (including car- and bikesharing) could open up possibilities for new types of more environmentally sustainable and collective travel offers or services, such as IMS. However, in communities where the private car remains the norm, the dissemination of IMS will probably face barriers.

Whereas normative beliefs are considered to shape the subjective norm concerning a behaviour, beliefs about the consequences of a certain behaviour shape the individual's attitude towards the behaviour (Ajzen and Fishbein 1980). Attitudes are judgements or feelings towards something, such as different modes of transport. Attitudes have been considered important to explain individual travel behaviour and have therefore also been investigated in an abundance of studies (Anable 2005; Fujii & Gärling 2003; Vredin-Johansson et al. 2006). However, recent research has begun to question the notion of attitude as determining behaviour. People may, for instance, have a very favourable attitude towards public transport or bicycling but other factors may still mitigate the use of these modes. Hence, attitude is only one of several factors that influence the individual's choice of transport modes, for example, in adoption or rejection of IMS.

Most travel patterns tend to repeat themselves from day to day or from week to week. Contradicting the notion of travel behaviour as determined by explicit evaluations of behaviour or conscious decision making, habit and routines have been considered a main determinant for individuals' travel behaviour, in particular commuter trips. Habits and routines create path dependencies or institutional stickiness at the micro level. Formation of habits prevents overload of information processing or effort, and the effort associated with a change from commuting by your private car to commuting by, for instance, public transport or a combination of different collective modes of transport may be too large a barrier for the individual traveller to overcome. Changes in travel behaviour are not likely to occur unless changes in travel options are very salient and have positive outcomes (Gärling & Fuji 2009).

Some individuals have been found to be more inclined to make changes than others (Anable 2005; Anderson & Stradling 2004). In Diffusion of Innovation Theory terms (Rogers 1983) these individuals can be described as 'innovators' and 'early adopters' compared to 'late adopters' and 'laggards'. Innovators may be triggered by curiosity and the novelty of a scheme, but fundamental for the majority of people is that the innovation, for instance IMS, is perceived as providing some kind of relative benefit compared to the existing solution (cf. Sochor et al. 2014).

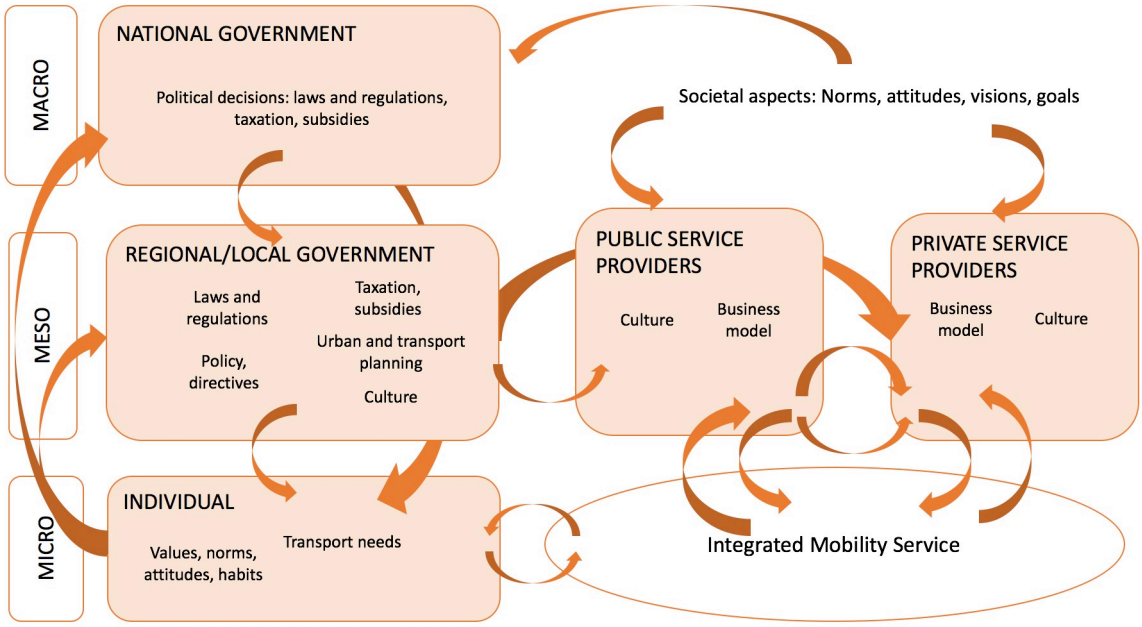
What people consider as possible choices can also be discussed in terms of 'action space' (e.g. Strömberg 2015). According to Strömberg (ibid.) it is important to differentiate between *actual* action space (e.g., infrastructure, access to modes, legal constraints, physical abilities, financial resources, etc.), *perceived* action space (shaped by e.g. knowledge about available options but also habits, etc.) and *considered* action space (actions considered, influenced by e.g. self-image, attitudes, etc.). What is perceived as one's action space can thus differ between individuals with otherwise the same actual preconditions. IMS have been shown to have the potential to open up travellers' perceived action space by breaking the lock-in effects of, for instance, car ownership (cf. Strömberg 2015) but in order to become also a considered option, the service must be perceived as offering a relative advantage.

- ***What norms are relevant for IMS and how do they relate to attitudes and behaviour?***
- ***Which habits and routines are obstacles to IMS?***
- ***Who are the individuals that consider IMS as a possibility (and who are the ones that do not)?***

- ***Do individuals' perceived action space change with the development and implementation of IMS?***

4.4. Figure of inter-relational aspects of institutional barriers and enablers

The following figure is an attempt to summarize the framework. Here the different levels of analysis are exemplified and related to each other in order to illustrate the complex web of interaction. The different levels are also summarized in the next, and final, section.



5. Concluding remarks and future research

IMS constitute an example of a policy process still very much in the development or initiation phase, even though there are examples of cases that have been tested (such as UbiGo in Gothenburg). This means that our empirical analysis cannot to a great extent rely on previous research, even though there are some studies available, primarily on the micro level (see e.g. Strömberg 2015; Sochor et al. 2014; 2015; 2016). Studies have also indicated the need to include broader political and societal institutional factors in order to understand the development of IMS. In this regard the research team consists of scholars with experience from research situated on the macro, meso and micro levels respectively, where the approach is to systematically synthesize theories on the different levels in order to reach a deeper understanding of the processes at hand.

In sum, we have argued that the macro level includes broader societal and political factors on the state (or international) level, including formal rules and regulations and broader societal norms, trends and perceptions. The meso level includes private and/or public actors on the regional and local levels, as well as the collaboration between actors and the emergence of business models in these processes. Again the range is from formal factors such as taxation, to informal factors such as organisational culture and patterns of cooperation between regional actors. Finally, the micro level includes the perspective of the individual – primarily as a customer – but also as a citizen. The individual is affected by different pull and push factors, but is also guided by informal aspects such as self-image and social status. All these institutions are interrelated and as such only separable in an analytical sense. The individual is guided in her choices by such factors as her personal ideals but also accessibility to public transport as well as municipal rules and regulations. In a similar way local public administrations are guided by their organizational cultures, their network opportunities (and experiences) as well as demands from above (politics) and from below (citizens). At the same time private actors, such as representatives from bikesharing or car rental companies act in accordance with different logics and encapsulate different roles. Each actor enters a collaborative network with their own ideals, cultures and expectations, and it is in these processes of negotiation and development that our study is situated.

The framework presented in this working paper will be applied using the research questions in the analysis of three specific IMS cases: one in retrospect (UbiGo) and two on-going (Västtrafik Innovation Procurement and EC2B). In the case studies we will employ different methods for data collection and analysis in relation to the three levels. Analysis of secondary data in terms of existing documents related to the cases will be performed. Primary data will be collected through interviews with different stakeholders representing the different levels of analysis and observations of emerging processes will take place. These findings will be related to a broader study on selected IMS in European cities, where cases from Hamburg and Helsinki are selected for further study and possible comparison with the Swedish cases. Through the empirical findings, the framework will be developed and refined and lead to generalizations on the institutional conditions for IMS. The findings will help illuminate which institutional factors enable or constrain the development of services such as IMS in the field of urban transport. The findings will provide the empirical and analytical foundation for suggestions on how formal and informal rules and practices can be modified to enable new IMS to contribute to sustainable mobility.

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