A topological approach to Mobility as a Service:

A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals

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What is Mobility as a Service Anyway?

Purpose of paper:
• shed light on concept and on what characterizes a MaaS service
• propose a topology to:
  - facilitate discussion
  - enable ‘comparison’ of services
  - understand potential effects

Method:
• literature review analyzing existing terms and definitions
• expert workshop identifying key aspects and service differentiations
• topology development and discussion
Terms/Definitions: Combined Mobility (CM)

Used by e.g. UITP, Västtrafik, Samtrafiken

Definitions tend to focus on combining *modes* in general, perhaps with the facilitation of planners, purchasing functions, etc.

Definitions typically broad – along the lines of ‘smart services, from planning to purchasing’ which may complement public transport (PT) or which may entail not needing to own a private car – leaving open what such services can entail, and thus lacking guidance as to *how* to achieve such services, e.g. how to combine modes.

Sochor, Arby, Karlsson, Sarasini, ICoMaaS, 2017-11-29
Terms/Definitions: Mobility as a Service (MaaS)

Used by e.g. MAASiFiE project, MaaS Alliance, Trafikverket (Swedish ITS Action Plan), Transport Systems Catapult, Kamargianni, Hietanen

Definitions tend to focus on the (aspects of the) service and not the modes, and sometimes bring in the term ‘integration’.

Definitions of the ‘new’ MaaS concept (vs well-established phenomena e.g. carsharing and taxis) also include other significant elements, such as customers’ needs, personalized/tailored and comprehensive solutions, an interface, a mobility platform, integrated payment, a contract, a service offer, a business model, a service provider, etc.

Aspects of goods transport (MaaS Alliance) and sustainability (MAASiFiE project) do appear, albeit rarely.

Sochor, Arby, Karlsson, Sarasini, ICoMaaS, 2017-11-29
Terms/Definitions: Integrated Mobility Services (IMS)

Used by e.g. IRIMS project, K2 Swedish Knowledge Center for PT

IMS is often used in *limited* reference to integrated *information* services, i.e. services that integrate information about different modes and from different service providers.

This is unfortunate, as this concept could potentially best capture the central elements of these ‘new’ mobility concepts (cf. MaaS).

Broader definitions of IMS tend to emphasize *integration of various services* in terms of e.g. multimodality, information, payment, and even other related services (deliveries, repairs) via a single/common interface.
Currently no established definition, and it is likely premature to provide ‘one definition’. No matter the term, it is about:

- Offering a **service** with customer/user/traveler transport needs as the main focus
- Offering **mobility** rather than transport
- Offering **integration** of transport services, information, payment and ticketing

Integration can, for example, comprise:

- **Integrated information services / multimodal travel information.**
  This + integrated payment services = MaaS’ ‘core’
- **Integrated booking or ticketing,**
  e.g. a ‘smartcard’ or a mobile app that can provide access to different modes
- **Integrated payment or invoicing**
- **Organizational integration** –
  Collaboration between providers a prerequisite, but how it occurs will differ
- **Bundling,** e.g. a subscription to trips with different modes –
  This has so far been the exception rather than the norm, but this may change
## Workshop: Identifying key aspects and service differentiations

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<th>Moovit</th>
<th>Hann. Mobil</th>
<th>Smile</th>
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<th>Whim/ UbiGo</th>
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Sochor, Arby, Karlsson, Sarasini, ICoMaaS, 2017-11-29
Proposed topology

1. Integration of information:
   Multimodal travel planner, price info

2. Integration of booking & payment:
   Single trip - find, book and pay

3. Integration of the service offer:
   Bundling/subscription, contracts, etc.

4. Integration of policy:
   Governance & PP-cooperation

0. No integration:
   Single, separate services
Achieving a transition to a MaaS-based transport system

MaaS has the potential to be a socio-technical transition

“...a gradual, continuous process of change where the structural character of a society (or a complex sub-system of society) transforms” (Rotmans et al., 2001)

Transition management outlines four activities that are key to governing sustainable transitions:

- **Strategic** activities are collaborative, multi-stakeholder processes, which aim to ensure that long-term visions (i.e. societal goals) are shared and embedded among collectives.

- **Tactical** activities link individual actor strategies to shared long-term visions created via strategic activities. They aim to overcome short-termism and to tackle the difficulties in implementing solutions by acknowledging complex sources of inertia within regimes, and by directing activities 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.
Practical use of topology

Swedish national roadmap for Mobility as a Service (KOMPIS)

• Help to describe ambitions and steps in collaborative effort

• Help to describe differences in prerequisites for infrastructure, regulations and policy
Concluding Remarks

Lumping all mobility services together under one concept creates confusion and potentially undermines the concept.

Not all services are ‘equal’ in the MaaS topology. The innovation, but also the challenge, likely lies in the integration entailed, as well as in the organizational integration (public – private) and the bundling.

Understanding the MaaS topology and its implications can:
• help nuance the conversation
• deepen the understanding of barriers and enablers for different levels
• facilitate service development, e.g. action plans tailored to the intended level and goals
Reflections and Potential Developments

Too ‘simplistic’? Not the purpose to present an exhaustive and static description of Maas, but rather a straightforward and dynamic tool.

Reflections and potential further developments:
• hybrids between levels
• issues of interpretation, e.g. multimodal public transport + travel planner + integrated ticketing/payment = Level 0 or Level 2?
• may exist additional aspects not applied to the levels, e.g. geographical context (urban, suburban, and rural MaaS)
• Level 4 could potentially be broken down into the three types of sustainability
• Level 4 could potentially be applied across all levels, including trade-offs between types of sustainability

Further analysis is desirable regarding the possibilities and problems linked with the different levels, preferably based on thoroughly evaluated case studies.

Such an analysis is key to evaluating and understanding which impacts and effects can be achieved via the implementation of different levels of MaaS services in terms of e.g. social, economic and ecological sustainability, as well as business potential.
Thank you! Questions?

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Sochor, J., Karlsson, I.C.M., Strömberg, H. (2016) “Trying Out Mobility as a Service: Experiences from a Field Trial and Implications for Understanding Demand”. In Transportation Research Record: Journal of the Transportation Research Board, No. 2542, Vol. 4, pp. 57-64, Transportation Research Board of the National Academies, Washington, D.C. 
http://dx.doi.org/10.3141/2542-07


MaaS RESOURCES – REPORTS AND WORKING PAPERS


MaaS RESOURCES – OTHER

http://www.vtt.fi/sites/maasifie/results (including downloadable deliverables and webinar link+pdf)
https://www.researchgate.net/profile/Jana_Sochor ; http://orcid.org/0000-0002-1304-485X
Sochor, Arby, Karlsson, Sarasini, ICoMaas, 2017-11-29
Chalmers – Design & Human Factors

Research with a user perspective (~25 researchers)
Urban mobility and transport systems one of three application areas

MaaS (Mobility as a Service) projects & activities (selected)

- IRIMS Institutional frameworks for integrated mobility services in future cities (2016-2018);
  partners Victoria Swedish ICT, Lund University, Trivector, Samtrafiken, K2

- PhD Candidate project (2016-)
  Integrated Mobility Systems: creating favorable conditions for procurement, development and use;
  partners Västtrafik and the region of Västra Götaland (VGR)

- Integrated mobility services “strategic case” (2016-)

- Jana Sochor coordinating the End-User Perspective WG (MaaS Alliance) (2015-)

- MariAnne Karlsson coordinating Impact Analysis within KOMPIS,
  the Swedish government initiative on Combined Mobility as a Service (2017-)

- MAASiFiE Mobility as a Service for Linking Europe (2015-2017);
  partners VTT and AustriaTech

- Go:Smart / UbiGo Field Operational Test (2012-2014);
  quadruple helix project (public and private sectors, academia, users)
RISE Viktoria

MaaS (Mobility as a Service) projects & activities (selected)

• Per-Erik Holmberg, project leader for KOMPIS, the Swedish government initiative on Combined Mobility as a Service (2017-)

• IMOVE EU H2020 (2017-19)

• IRIMS Institutional frameworks for integrated mobility services in future cities (2016-2018); partners Chalmers, Lund University, Trivector, Samtrafiken, K2

• Integrated mobility services “strategic case” (2016-)

• SHIFT Sustainable Horizons in Future Transport

• DenCity

• Go:Smart / UbiGo Field Operational Test (2012-2014); quadruple helix project (public and private sectors, academia, users)