MaaS-Ladder:
Success indicators for Mobility as a Service initiatives

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Introduction
Metropolitan areas are becoming increasingly congested as population densifies. How people travel into and/or within cities is changing rapidly [Alonso-González 2018], [Jittapirom 2017], [Harms 2018]. To adapt to these mobility changes a new service concept has been introduced worldwide: Mobility as a Service (MaaS)[1] . This project aims to aid public authorities pointing out the criteria crucial to the success of MaaS initiatives.

Emergence of MaaS
The emergence of MaaS is due to several factors, including factors directly contributing to the efficient and more sustainable use of both urban space and time. [Alonso-González 2018], [Jittapirom 2017], [Harms 2018]. One of these factors for example is a growing global tendency of young people preferring the sharing of transport and utilisation of mobility services to owning vehicles personally.
However, the concept of MaaS spells versatility and thus presents multiple challenges of its own. Which criteria are crucial for the success of MaaS initiatives? And are urban areas equipped to rise to the occasion?

Success Indicators for MaaS initiatives
The rapid changes in travel modes and the wide range of mobility app services and sharing vehicles initiatives make it difficult for public authorities to evaluate the potential success of MaaS initiatives. The proliferation of initiatives emphasizes the need for public authorities to assess potential success. After all as every initiative sets forth new questions of f.e. physical, spatial, virtual, legal and/or political accommodation and therefore investment of a manifold of resources. The MaaS-Ladder, provides a step-by-step checklist of criteria and actions to assess MaaS initiatives, to guide and advise public authorities in metropolitan areas.

Funded by Dutch government, HAN university of Applied Sciences has developed indicators for the potential success of MaaS initiatives together with Movares Consultants and the city authorities of a.o. The Hague and Utrecht. These indicators jointly present an integral overview of all 'high impact' rated aspects affecting the potential success of any MaaS initiative. These indicators have been validated in Dutch urban areas but are expected to be applicable to other (non-Dutch) metropolitan areas as well.

The MaaS success indicators represent all actors in a MaaS initiative [Haanstra, 2018] and include further sub-criteria specific to each individual actor. An action scheme is constructed for public authorities enabling the exact targeting of MaaS-Ladder aspects, increasing the potential of a MaaS initiative. The action scheme includes the conduct of a baseline measurement, the assessment of the initiatives ambitions and finally the monitoring of implementation.

The MaaS success indicators are validated through five MaaS initiatives in the Netherlands. The figure below shows the scores for a MaaS initiative in the densely populated city of The Hague, the Netherlands.

[1] MaaS is defined as *mobility services which are demand responsive and offer personal tailored multi-modal travel options by a digital platform including financial transactions and real-time information before and during traveling* [Harms 2018].

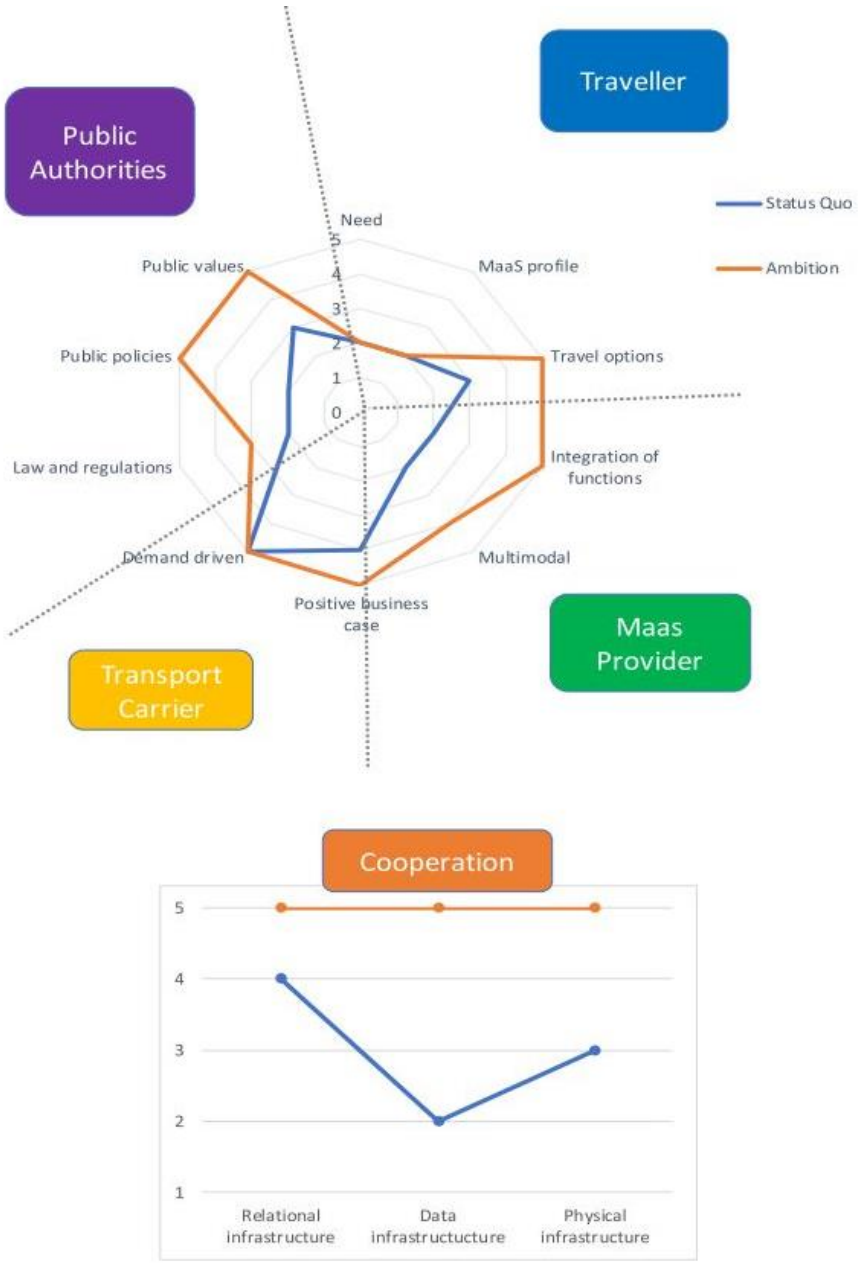

Figure 1: Example of MaaS-indicators'assessment for the city of The Hague, the Netherlands

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