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Mobility-as-a-Service: Creating mobility platforms for tomorrow

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Content

Innovative mobility services are disrupting the market Page **3**
Modern mobility solutions are providing on-demand mobility without cost of ownership

MaaS solutions have the potential to consolidate the fragmented mobility landscape Page **4**
Mobility-as-a-Service platforms as the single access point for a whole mobility ecosystem

MaaS platforms will exist on an interregional and a local level Page **5**
Local asset-based providers are competing with global digital platform providers

Standardisations of data and APIs will support the development of MaaS platforms Page **5**
Insights into the technical integration

Mobility-as-a-Service: Creating mobility platforms for tomorrow

Modern trends such as urbanisation, digitisation, shared economy and sustainability are straining existing urban infrastructure and questioning established concepts. New innovative solutions are being developed to cope with the arising demographic and ecological challenges – such as city quarter solutions, alternative fuel propulsion, and more recently disruptive mobility solutions. The latter range from already established car sharing or ride hailing to cutting-edge ride pooling and new micro mobility services, e.g. in the form of e-scooters. One can see the end of the division between motorized individual traffic and public transport. Instead, a vastly fragmented mobility landscape has appeared in which traditional transport providers such as the public transport operators and OEMs are competing with multiple new players, ranging from asset-based service providers to pure tech companies. As different as the players might be, there is a common target of these services when it comes to the user: The focus is on providing platforms for on-demand mobility with zero cost of ownership (cf. Figure 1).

Innovative mobility services are disrupting the market

The rise of mobility services has irreversibly changed the way mobility is experienced in urban areas and will do so even more in the future. The possible extent of this disruption can be seen via the following indicators:

1 Transformation: Traditional business models in the automotive and car rental markets are being uprooted. Whether it is ACES or CASE, connected autonomous vehicles, car sharing and electric mobility are the new drivers.

2 Asset-light: Digital players are entering the market and deploying asset-light business models in which they provide mobility platforms that connect users with demand to drivers and vehicles without owning these assets themselves.

Figure 1: Range of various mobility services characterized through the degree of ownership and availability.

3 Mergers & Acquisitions: Companies are resorting to acquisitions to quickly build up competencies and reach into areas of innovative and data-driven mobility solutions. In addition, traditional OEMs are establishing joint ventures to consolidate their strength in a highly competitive market.

4 Micro mobility: Bike sharing is already well-established and being complemented by e-scooters. With regulation in place, niche providers are appearing quickly or are even already being acquired by established players.

5 Public transport in a digital transition: Public transport operators are feeling the impacts of the disruption and are trying to withstand the pressure. Smartphone applications and digital ticketing have become the norm rather than the exception, and the transition to Mobility-as-a-Service platforms is beginning.

It is obvious that the innovation of services and the disruption of the mobility industry has triggered substantial progress and reinvention. Nevertheless, it seems – definitely from a user perspective – that this change might be extended through integration. So far, significant effort has been put into offering attractive, but still isolated mobility solutions to the user.

In the end, the user needs to get from A to B, with certain user-dependent preferences focused on time, price, comfort and sustainability, amongst others. In today's setting, this need is met by an extensive amount of individual mobility pieces that are yet to be put together to form a holistic picture. Only when establishing the integration of individual services can a user experience mobility that is truly without cost of ownership, on-demand, and seamlessly multi-modal.

MaaS solutions have the potential to consolidate the fragmented mobility landscape

The market disruption is the precondition and stepping stone for the deployment of Mobility-as-a-Service platforms. In a sense, mobility platforms have the potential to integrate numerous stakeholders, from private mobility providers, to public transport and even policy makers to enable a flexible, convenient, and personalized user experience. In addition, they can build the foundation for a value-adding ecosystem of mobility and third-party services [1].

MaaS solutions deployed today can be differentiated into five different levels of integration [2] and two different layers: asset-based vs. non-asset based providers (cf. Figure 2). Firstly, mobility services are aggregated on an informative level, providing the user with a consolidated multimodal view, an intermodal transport planner, and indicative trip prices (Integration Level 1). Platforms providing full depth integrations extend the service offering by providing booking and payment integration for the integrated transport modes along a single trip (Level 2). Going further, fully subscription based services enable the user to access all included mobility services according to the agreed subscription plan (Level 3). Finally, some first platform providers work closely with authorities and policy makers, integrating them as an additional stakeholder into the platform ecosystem for decision-making and setting city-related conditions (Level 4).

In order to support the different steps of the user journey, from planning to booking and payment, an implementation of modular components might allow one to efficiently develop, enhance and scale a MaaS platform (cf. Figure 3).

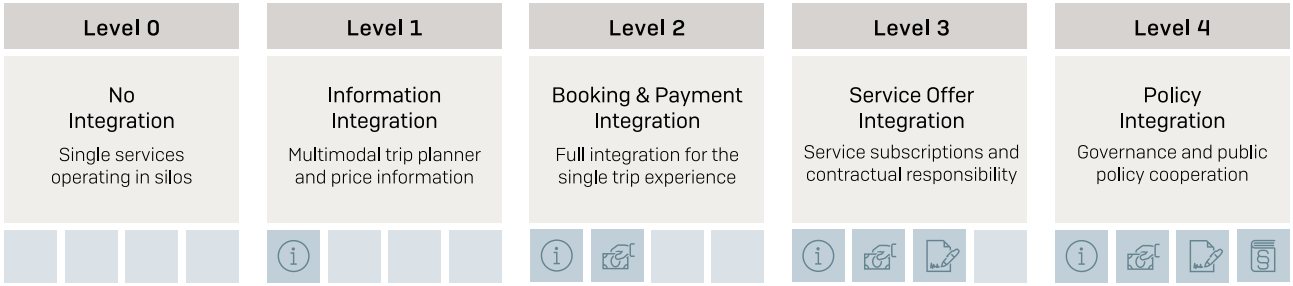

Figure 2: Ascending levels of service integration within MaaS platforms that can be provided by asset-based or non-asset-based providers.

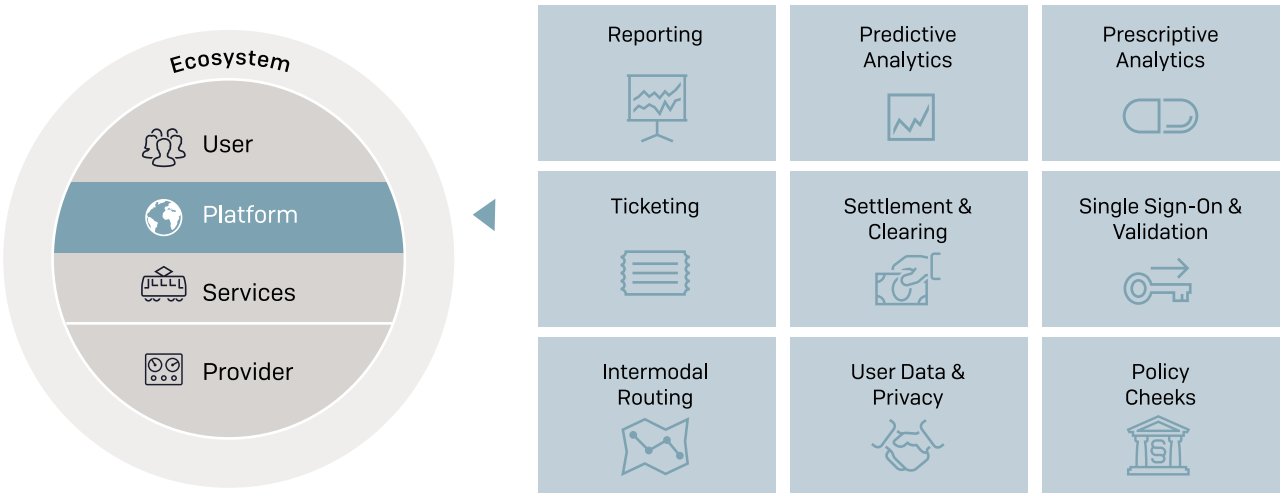

Figure 3: Micro services running on the platform improve the service offering of the platform provider and enhance the experience of the mobility user.

The services running on such platforms perform specific tasks such as handling user data, enabling single sign-on or intermodal routing while exchanging necessary data through well-defined and standardized APIs. For higher levels of integration, digital ticketing as well as settlement and clearing modules are required – possibly integrating third party providers. As the platform itself also becomes a large mobility data platform, data driven intelligence systems can be built up on-top of the data, enabling mobility analytics, business reporting, predictions for last-mile service availability forecasting, and prescriptive analytics for direct operational integration. The implementation of policy checks and the analysis of what-if scenarios become possible even in real-time.

MaaS platforms will exist on an interregional and a local level

Currently, different players trying to place their mobility platform in the market: from public transport operators that are working with specialized service providers to build their own local MaaS application through to larger asset-light technology companies who are trying to integrate services on global scale. In both cases, the core of the product is a user-centric functionality, providing personalized intermodal routing as well as integrated booking and ticketing solutions. It is yet to be seen how the MaaS platform market will turn out and which developments will survive the test of time. Still, the general perception is that regional solutions might focus on the local dependencies and will be complemented by a few larger, more global solutions that scale across boundaries and borders.

While the digital proficiency and market-driven agility of technology companies is a key competency for the development of MaaS platforms, local providers such as public transport agencies can benefit from their vicinity to local authorities and can leverage their expertise on the local mobility landscape. In any case, MaaS platforms have the potential to form a whole ecosystem beyond the consolidation of the mobility services themselves (cf. Figure 4). Policy making and investment decisions by local authorities or states can be based on insights from the mobility platform, as well as the formulation of required regulations and (open) data standards. Furthermore, enhancing data providers or other services such as food, hotels, leisure, and entertainment can be integrated into the platform and enhance the offering.

Standardisations of data and APIs will support the development of MaaS platforms

A diverse system landscape and different playing fields between legacy systems of traditional mobility providers and modern architectures at disruptive tech players exists. Nevertheless, standardised data formats and interfaces are crucial for an efficient technical integration of mobility services. Initial projects have established data formats e.g. with Google developing the General Transit Feed Specification (GTFS) for uniformely sharing heterogeneous public transport data. Analogously, projects in Germany such as DELFI (Durchgängige elektronische Fahrgastinformation) are working on common standards to improve the usability of data beyond the boundaries of local systems.

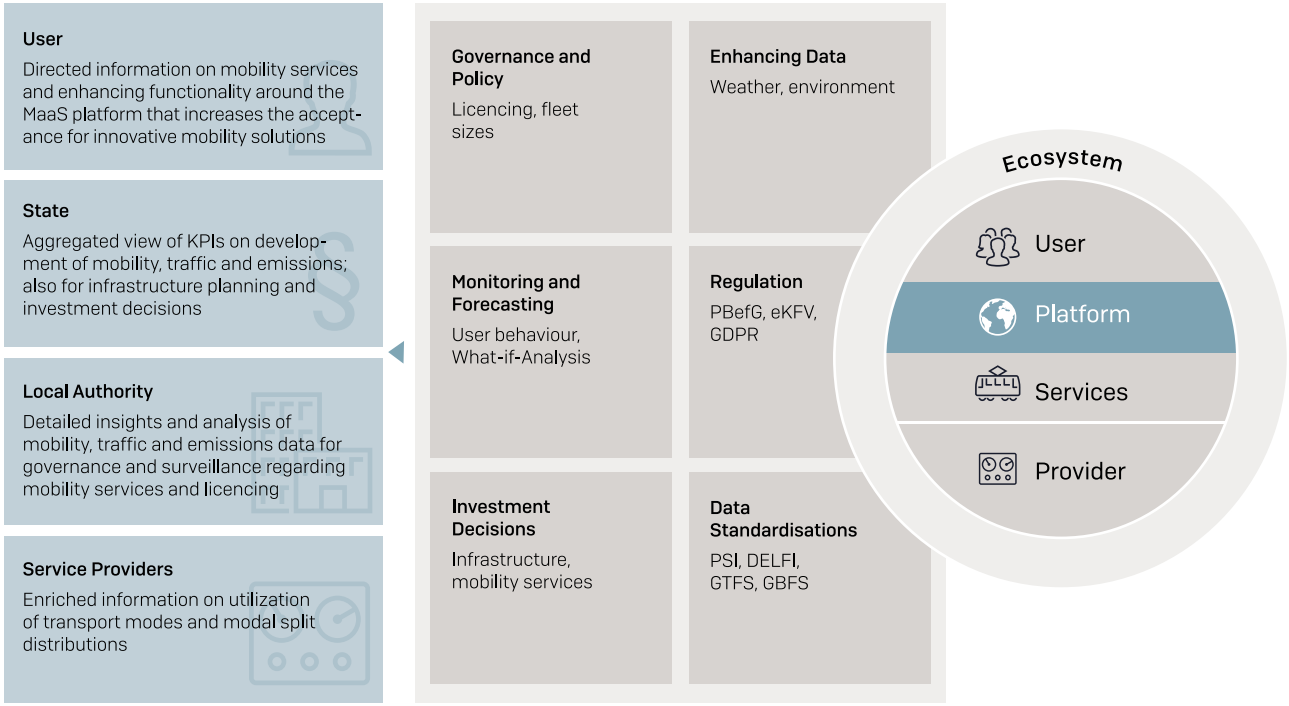

Figure 4: Stakeholders can benefit uniquely by participating in the mobility ecosystem.

In addition to information sharing, efforts are also being made to provide standardisations for the higher level of MaaS integration. In Germany, the VDV (Verband Deutscher Verkehrsunternehmen) is supporting standardisation within ticketing and clearing, e.g. through the eTicket initiative and respective certifications. Such efforts could be expanded into the other forms of transportation in order to provide benefits for public transport.

With the GBFS (General Bike sharing Feed Specification), information integration for bike sharing is following in the footsteps of the GTFS. On the one hand, specifications like GBFS could be extended to general sharing services (e.g. car-sharing, scooter-sharing, ride-hailing) and on the other hand, standards are needed to establish reservation, ticketing and booking processes on a complete and deep integration level, respectively.

Only with established standards can mobility services be scalably integrated into MaaS platforms and value-adding micro services be built cost-efficiently within the ecosystem. Such a standardisation of data formats and APIs might simplify the technical integration and generate benefits for providers, local authorities, states, and users.

Appendix

References

[1] MaaS Alliance: What is MaaS? https://maas-alliance.eu/homepage/what-is-maas/

[2] Sochor, Jana & Arby, Hans & Karlsson, Marianne & Sarasini, Steven (2017). A topological approach to Mobility as a Service: A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals.

Our service offerings

On-demand services, autonomous shuttles and smart ticketing are becoming more and more attractive for mobility consumers. Therefore the implementation of such services poses technological, processual, and methodological challenges for public transport and mobility providers. We prepare you for the changes of tomorrow!

d-fine supports you in:

- the development of intermodal mobility platforms and integration of data analytics modules;
- demand modelling, dynamic pricing, as well as smart timetable, routing and ticketing solutions;
- the analysis of regulations, their reporting requirements, and impact on your existing business models.

Whether proof-of-concept or integration into operations: we support your project from the first workshop to the technical design and implementation. d-fine is your reliable partner.

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