Traffic Management: the invisible actor in the MaaS value chain

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Some critical factors that have resulted from the recent growth of cities, greatly affect daily urban mobility: the car density with respect to the surface of the city; the structure of the urban areas that prevents radical viability transformation; the tourism flow (although usually concentrated in specific periods of the year); increased needs to move and increased transportation offer, the inefficient use of the vehicles, and the daily people flows from the suburbs to downtown and vice versa, are such factors that contribute to the rise of environmental, mobility and social costs which are becoming difficult to sustain for today's cities. Cities, in their attempt to address these issues, are beginning to outline clear targets across the three pillars of sustainability: environment, quality of life and social welfare. Within this context, a new concept as Mobility as a Service (MaaS) can be defined as the integration of various forms of transport services into a single mobility service accessible on demand [1]. For the user, MaaS offers added value through a single point of contact to provide access to mobility, with a sole payment channel instead of multiple ticketing and payment operations. MaaS aims at providing an alternative to dependency on car ownership that may be seen as convenient, flexible, reliable and cheaper. For the implementation of MaaS the availability of dynamic, high-quality data is a mandatory need, and vice-versa, similarly interesting it is to study how the data gathered by MaaS operators could be used to enrich and qualify the other data sets of transport systems. The data gathered by MaaS services are often location- and time-specific and provides also information about user behaviour and preferences. This data, when anonymised, would become an invaluable asset when combined with conventional data sets and sources used for traffic management, and transport and urban planning purposes.

Therefore, MaaS aims at optimisation and more efficient use of the city transport system and this builds an important link to traffic management and TM2.0 (Traffic Management 2.0). [2] TM2.0 stands for a new proven collaborative concept for Traffic Management and Control, in which the travellers and goods, through the use of new technologies and sensors, become entirely part of the data supply chain. It offers great new opportunities for Traffic Management and Control making it, on one side, cheaper and more efficient for the road operators, and, on the other side, more custom, friendly and acceptable for the users. This is done combining effectively data collected by the infrastructure and from the mobility services in the vehicles and smartphones. Current navigation systems in the vehicle use traffic information to provide individual route advice to drivers, missing however the information related to traffic circulation strategies, traffic regulations or prioritized routes put in place by the TMCs. TM2.0 aims to close this loop and facilitate interactive traffic management. The Road Operator sends its Traffic Management Plans as these are decided by the Public Authorities to the Service providers operating in the area, who then send tailor-made information to their customers with regards to routing provided via the in-car navigation device. Therefore, according to the vision of TM2.0, the future of traffic management is to combine intelligently the individual driver objectives (individual users' optimization) together with network wide management strategies (system optimization and equilibrium) in a win-win scenario.

MyCorridor [3], a 3-year project, funded by the Horizon 2020 programme has the overall objective to achieve sustainable travel by creating a MaaS environment that would lead travellers in replacing private vehicle ownership by vehicle use. The work in MyCorridor is based on the concept of TM 2.0 to be extended beyond the vehicle world by providing a solution that incorporates multi-modal, seamless, flexible, reliable, user-friendly, all inclusive, price-worthy and environmentally sustainable travel at cities and regions and most importantly across all Europe, leveraging on this invisible actor of the MaaS value chain, which is the Traffic Management.

Today, traffic management plans (TMP) are not part of the dynamic traffic information delivered to the vehicles. At the same time, the individual vehicle behaviour (intended, in relation to the route guidance system plans) is not made available to the traffic management system. Still, an efficient TMC integration into multimodal MaaS has not been even attempted. The MaaS concept can institute a new sphere in traffic management, where traffic optimization measures and advanced services for the end-user can also be enabled by mobility service. The concept of TM2.0 builds upon the deployment of connected vehicles and travellers to achieve convergence of mobility services and traffic management, combining actions of the individual travellers with the collective mobility objectives. This way, TM2.0 connects the innovative developments in the vehicle and on the road while improving the value to the legacy systems and, at the same time, creating new business opportunities; a new business paradigm shall be deployed in which TM becomes part of the multi modal service offering of a MaaS product.

In the future MaaS world, Road Operators will have access to more dynamic traffic data (e.g. travel time, speed, traffic flow etc.) from a range of vehicles and transport modes not just road traffic data from traffic information service providers. Through the access to information about scheduled events by network operators and municipalities, traffic data services related to forecasted travel time estimation, forecasted level of services can be realised. But, how to model this win-win

scenario from a business point of view?

The mobility and transport domain is a domain that is typically heavily biased towards thinking primarily in terms of solutions and corresponding infrastructures, and only later in terms of values for specific customer segments. To try and reverse this way of thinking, i.e., start from the customer value perspective, we have chosen to explicitly include a business modelling effort. We use BASE/X as a practical framework, given its demonstrated potential in the domain. BASE/X is a business engineering framework for service-dominant business, i.e., service-oriented business that puts value-based service management at the forefront [4]. BASE/X covers the entire spectrum from high-level business strategy definition to business information system architecture design, including elements like business model design, business service specification and business process modelling. In this paper, we concentrate on business model design using the BASE/X business model radar (BMR) technique, which has proven useful for interactively creating collaborative business models in the mobility and transport domain [6].

The BMR technique uses a circular diagram to represent multi-party, service-dominant business models and is centred on the co-produced value-in-use, i.e., the added value that the collaboration produces for a customer. Each actor (participating organization) in the collaboration is represented by a pie slice in the radar. One actor is always the focal organization (the party that is in the lead of executing the business model). One actor is always the customer. There can be an arbitrary number of other actors. The actor value proposition defines why an actor is part of the business model from the customer point of view. The costs and benefits explain why an actor wants to be part of a business model from its own perspective. In modern business models, the value of data plays an important role here.

We have applied the BMR technique for modeling the win-win business scenario derived from the integration of MaaS with Traffic Management. From this design session, a number of lessons can be learned. Firstly, it appeared that for many participants it was quite new to start thinking in terms of values and customers, placing solutions and infrastructures 'on the second rank' (these are implicitly included in the actor coproduction activities in the BMR). In other words, it was new to place the 'why' of a collaboration (or solution) before the 'how' – but this way of thinking was generally found worthwhile. Secondly, it became clear that the concept of customer was ill-perceived: very different kinds of solution users were treated as the same. Thirdly, having multiple business models implies thinking about how to represent infrastructure costs in the costs and benefits of a BMR: multiple business models may use the same infrastructure – depreciation models or pay-per-use models may help here. Fourthly, by explicitly modeling the actor value propositions, a much better view was generated on the required collaborators in a business model.

The Traffic Management – MaaS convergence can enable Road Operators to implement interactive multimodal traffic management and implement traffic management measures to optimize the multimodal network capacity thanks to the use of all vehicles and transport modes available by the deployment of network wide multi-modal management strategies (system optimization and equilibrium) obtaining through a strictly Road and MaaS actors cooperation. MyCorridor project aims to prove this concept defining and implementing "ad hoc TM2.1 Use cases". This advanced Traffic Management concept will bring to a new customer-oriented business model approach.

References

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