Car sharing schemes and MaaS: A study of shifting mobility practices from ownership to access

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Abstract

Transport levels and private car use continue to increase worldwide representing complex challenges to climate change mitigation and the liveability of cities. In recent years, interest has arisen in the concept of Mobility-as-a-Service (MaaS) as one possible path towards sustainable mobility futures. MaaS builds on the idea of a shift from private car ownership to a seamless and integrated system providing access to multimodal mobility options including public transport and shared mobility services like car and bike sharing. Currently, only few examples of MaaS schemes exist and knowledge of user experiences is limited.

The aim of this paper is to contribute to a better understanding of how shared mobilities, like in MaaS, fit with the everyday life of citizens. Methodologically, the paper draws on insights from qualitative interviews with families using a car sharing scheme in Copenhagen. The interviews are informed by a practice theoretical approach to study the potential of integrating car sharing within the complex of social practices from which the everyday life consist. To inform the discussion of our empirical results, and their implications for future MaaS designs, we base our study on a literature review of existing studies of user experiences with MaaS and an analysis of user practice representations in existing MaaS trials.

Our findings indicate three ways forward to promote MaaS as an alternative to private cars. First, future MaaS designs should aim to acknowledge the importance of the interconnections between mobility and other everyday practices. Second, the shift from ownership to access provides several positive benefits like modal flexibility and a new sense of freedom, which the future MaaS design should focus strategically on in order to challenge the ideals around individual ownership. Third, strategic interventions that privilege sustainable mobility solutions through effective initiatives such as road-pricing and physical limitations in private car traffic and parking are needed.

Introduction

The continued growth in car-based transport results in increasing levels of climate change impact. In Denmark, car-based passenger transport accounts for about 20% of the CO_2 emissions related to energy consumption in 2018 (Danish Energy Agency, 2020). While other consumption areas have demonstrated reductions in recent years, the emissions from transport continue to increase. Thus, there is an urgent need for reducing mobility-related emissions. This call for action is strengthened by the further negative implications for the environment, public health, congestion and liveability of cities from a system dominated by automobility and private car ownership.

In recent years, the concept of Mobility-as-a-Service (MaaS) has emerged in discussions of future sustainable mobility. While no consensus on the definition of MaaS yet exists (Jittrapirom et al. 2017), Hensher et al. (2020) identify a number of commonalities across different applications of the concept; namely that MaaS is a user-centred, multi-modal and integrated transport service. In addition, many authors also include normative dimensions like goals of sustainability and reduced private car ownership in the definition of MaaS. For instance, Sochor et al. (2018), who have contributed with an oft-cited MaaS typology, defines the highest level of MaaS (level 4) as "integration of societal goals" with the "added value" of "reduced private car ownership and use, a more accessible, livable city, etc." (p. 11). In short, MaaS denotes an ideal of a shift from car ownership to a system based on a seamless integration of existing and new mobility modes, which the users can access via one single platform (a smartphone app). The mobility modes typically include both "traditional" public transport services and private services (e.g. taxi) combined with shared mobility services such as car, ride and bike sharing. The latter modes of transport have attracted much attention in recent years, as they are often seen as part of a more general transition towards an economy based on sharing economy or collaborative consumption (Schor & Fitzmaurice, 2015). These services involve a shift from ownership to access which may affect the way mobility forms part of the everyday life of citizens. However, research has so far provided limited knowledge on user experiences with MaaS solutions (Lyons et al., 2019).

In this paper, we study Copenhagen families' experiences with integrating car sharing in their everyday life. On basis of qualitative interviews with these families, our aim is to contribute to a better understanding of how a shared mobility scheme, like the studied, fits with daily practices of citizens living in a major city. It is our hope that the findings can inform the design of more sustainable shared and integrated MaaS solutions. To facilitate the discussion of the design implications of our empirical findings, our study includes a literature review and analysis of user practice representations in existing MaaS trials; i.e. how the users' way of using MaaS is envisaged. These representations are compared to the findings from the interviews.

Theoretical approach

The theoretical approach of the paper builds on social practice theories, which has been applied across several fields, including mobility studies (e.g. Friis, 2016; Hasselqvist, Hesselgren, & Bogdan, 2016; Laakso, 2017; Spurling & McMeekin, 2014). Practice theories imply a turn from studying individual behaviour to the study of practices by viewing people not as individuals but rather as carriers of practices (Reckwitz, 2002). Even though the empirical approach may be to study the individual performances of practices, such an approach is also a study of the collective entity of what people do and say, which exists across time and space of these performances (Schatzki, 1996). Practices thus structure performances, but through their performance, practices are also reproduced in certain ways (Southerton, 2012). Practices are constituted of heterogeneous and interlinked elements. Shove & Pantzar (2005) identify three different forms of elements: meanings, materials, and competences. As an example, the practice of commuting by bike is shaped by elements of meanings (e.g. that it is the fastest, healthiest and most convenient way to get to work), of materials (e.g. the bike itself and the infrastructure of the city that allows for bicycling), and of competences (e.g. the skills of going by bike and the knowledge of traffic rules).

Mobility practices can be performed as separate practices, but are almost always performed in close relation to other everyday practices. This means that mobility practices both influence on and are

influenced by other everyday practices. Hence, the vision of MaaS entails an integration of several mobility solutions connected to different mobility practices that are closely embedded in people's everyday routines of working, shopping, visiting friends and family etc. Therefore, shifting mobility from ownership to access may imply changes to a variety of other aspects of everyday life than only that of mobility, which is important to study (Hesselgren, Sjöman, & Pernestål, 2019).

Our practice-theoretical perspective is supplemented with an analysis of what we have termed *user practice representations* of MaaS. This is inspired by Akrich's concept of "scripts" (1995) and it defines how in particular designers of MaaS services envision how the users are going to use these services. The description of these user practice representations informs the later discussion of whether the visions of MaaS fit with the findings about mobility practices and shared mobility in everyday life from our study of a car sharing scheme.

Methods

The empirical work of the paper consists of qualitative semistructured interviews with seven families living in urban areas of Copenhagen who currently use shared cars. In addition, four of these interviews are combined with drive-along interviews (Carpiano, 2009). The empirical work is centred around families with children, as they provide a unique opportunity for studying changes in mobility practices, because considerations of car access are often connected to the event of having children (Freudendal-Pedersen, 2009; Godskesen, 2002). The car sharing service investigated for this paper is a non-profit association offering station-based (round-trip) car sharing – a type of service that is expected to be an element in the future MaaS solutions. Six of the interviewed families consist of a couple living together with children, while one family is a single-parent family. Except for one family, all have experience as former car owners, and they all have a limited need for car driving in their present everyday life. Spending time and expenses related to parking are in general expressed as one of the major reasons for them to not own a car. The empirical work was undertaken during the COVID-19 pandemic with four interviews taking place in late spring 2020 and three taking place in the winter 2020/2021. The latter interviews were carried out as online interviews due to COVID-19 restrictions at the time. The semistructured interviews (lasting about 1.5 hours, except for one lasting about 3 hours) were audio recorded followed by verbatim transcription and analysis.

Key findings and conclusions

Our analysis of MaaS user practice representations shows that current MaaS schemes and literature are grounded on an understanding of everyday mobility as being essentially based on rational, informed and choice-making decisions. In addition, MaaS user practice representations often build on a portrait of today's everyday mobility practices as being cumbersome, unreliable and inconvenient. Consequently, emphasis is put on how MaaS will take over the cognitive efforts associated with planning and carrying out door-to-door integrated and multi- and intermodal journeys and provide convenient, comfortable and efficient mobility to its users. The essence of this vision of the future MaaS service is, perhaps, best described by Sampo Hietanen, CEO of Maas Global and a pioneer within the MaaS development, in this statement: "The central idea of MaaS is a promise that we will get you where you need to go, but how we get you there is not fixed" (Hietanen, 2020).

This conceptualization of existing everyday mobility practices contradicts the findings from our interviews with families using car sharing. First, the interviews show that the routine character of mobility practices and related everyday practices may stand in opposition to the idea of "ultimate flexibility". Everyday travel is embodied and routinized practices that are not changing on a regular day-to-day basis for two reasons: The individual practices are constituted by connected elements of materials, competences and meanings that together form a close-knit entity with much inertia. In addition, mobility practices are connected with other everyday practices through bundles and complexes, which adds further inertia to the individual practices. One example of how everyday mobility is highly routinized is given by one of the interviewees, who explains: *"I don't really think we consider it* [choosing between train and shared car]. *We consider it for* [visiting] *your parents, should we do this or that. But for my* [parents] *for example, there we do not consider*

it anymore. (…) I don't even know how those habits are built. That is a very good question. You don't necessarily think about that."

As our literature review shows, the MaaS development is often shaped by the aim of providing a solution that can compete with the private car in terms of convenience, efficiency and comfortability. While appreciating that MaaS could play a key role in the sustainable transition of mobility, we find that creating a seamless MaaS system with the same qualities as owning a private car might be impossible. As the interviews show, private cars offer a level of convenience and flexibility, without the need for constant planning and being dependent on the limitations of shared resources (like cars), that it will be difficult for MaaS to provide. For instance, using a car sharing scheme involves a further level of planning compared to having your own car. Pre-scheduling and planning days in advance is a recurring theme in the interviews, and is something that complicates things, even though it is not something that is emphasised as highly problematic. As one interviewee explains: *"Well, it is not something that bothers me a lot, I believe, but things need to be planned, you know. One has to decide, okay, when are we going home, and* [one has to] *make that booking. It makes it a little more inconvenient to stay for an extra day* [in relation to visits].*"* However, several of the interviewees note that car sharing provides convenience related to parking. The cars in the studied car sharing scheme have dedicated parking spaces, which means that it is easy to park the car after end of travel. This is highlighted as an important benefit by several interviewees.

Our findings indicate different ways forward to promote MaaS as an alternative to private car use. *First*, in designing MaaS solutions, the relations between mobility and other everyday practices should be acknowledged. Thus, future MaaS should take into account how mobility is entangled with family life and how this involves, for instance, the need to bring along luggage, shopping large items or taking care of children. As part of this, solutions should ideally be able to accommodate to the temporal contingencies of everyday life; like when complaining children delay the planned departure to the second home or being caught up in good company with friends (delaying the departure from visits). It is exactly this sort of flexibility and convenience the private car offers, and which the MaaS solution is difficult to be on a par with. Additionally, it is important to study further to what extent the dependency on ICT solutions in MaaS can act as a barrier to some people (the digital divide).

Second, despite the (basic) limitations of MaaS, shifting from ownership to access comes with several positive things, which might provide convenience *in other ways*. Avoiding the hazzle of finding vacant parking lots is mentioned above. Another evident example from the interviews is how the families express a sense of freedom from maintenance of a private car. As one interviewee, and former car owner, explains (with reference to both parking and maintenance): *"Yes and then I would just like to say that it is in fact very difficult to find those parking spaces, but also there are other things that you have to deal with when you are a car owner, it has to be washed, it has to go to a car workshop, it has to have its tires changed – argh, I thought it was annoying. I do not have to think about that at all anymore."* Also, the modal flexibility of MaaS should ideally make it possible to adapt choice of mode to the specific needs and situations; like in examples from the interviews with choosing the right shared car to the specific situation. This sort of benefits from MaaS should be highlighted more in order to challenge the private car as the ideal mode of transport for especially families.

Third, but not least, the interviews and literature review suggest that shared mobilities and MaaS will continue to be in intense competition with the private car *as long as* urban planning, transport infrastructures and policymaking keep favouring automobility. As Hensher et al. (2020) point out, the evidence so far suggests that MaaS will not be a "game changer", unless the car is made less attractive through initiatives such as road-pricing and physical limitations through land-use planning in private car traffic and parking. Here, inspiration might be found in the EC2B trial in Gothenburg, Sweden, which supplements a MaaS solution with physical and social interventions to support the uptake of non-private-car-based mobility practices (e.g. no residential car parking and establishing local user communities). This illustrates, in line with Spurling and McMeekin (2014), how policy interventions can encourage sustainable

practices (cycling, walking or shared modes of transport) by discouraging the unsustainable counterpart (private car driving) by challenging the competition between the two types of transport practices through planning (less car parking and reduced road capacity, e.g.) and administrative-institutional measures (e.g. increased parking charges).

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