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The role of data in sustainable urban mobility policy

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Summary

One of the main challenges facing European cities and a matter of concern for many EU citizens is the transition towards sustainable urban mobility (ECA, 2020). Mobility plays a role in most economic and social activities, and, accordingly, enables economic growth and societal and human development. At the same time, however, urban areas are burdened with negative impacts from transport activities, such as congestion, harmful emissions, traffic accidents, and noise. Transport is a major source of greenhouse gas (GHG) emissions, and one of the few sectors in Europe where emissions did not decrease between 1990 and 2017 (EEA, 2019). Modelling of abatement options has shown that new, cleaner propulsion technologies (e.g. electric vehicles) will not reduce CO_2 emissions of transport sufficiently to achieve the European climate goals (EC, 2021). Various ways to address these issues have been proposed. Car trips should be replaced by public transportation and, at shorter distances, by 'active travel' (i.e. walking, cycling, e-biking) (Brand et al., 2021). Avoiding the need to travel in the first place, (for instance through online working) is another possible strategy.

Recently, another way to contribute to the transition is raised by the New European Urban Mobility Framework (EU, 2021), emphasizing the importance of modeling "to support mobility decision-making in an integrated matter". It also highlights the use of urban mobility data to support this for which it could bring new opportunities. Despite an increasing number of studies on the potential of data for mobility policy, it is unclear whether and how this is adopted in policy practice. It is also not known what the needs and priorities of urban mobility planners are in this respect (Isaksson et al., 2017). This thesis thus aims to explore how data could better support sustainable urban mobility transformations. The more specific objectives are to investigate the current role of data in urban mobility policy practice and to investigate how data can support urban policymakers more effectively in the sustainable mobility transformation.

Chapter 2 first seeks to better understand the context in which urban mobility planners operate, which has a multi-level character concerning policy and governance. Although local governments have the most specific executive policy power concerning urban mobility through the subsidiarity principle, the sustainable urban mobility transition is clearly shaped by regional, national and supranational levels too. The different policy instruments employed at different governance levels jointly affect urban mobility and also affect each other (i.e. form a 'policy mix'). Based on 32 semi-structured interviews with mobility policymakers from various governance levels, this chapter highlights the key multi-level governance conflicts for the urban sustainability mobility transition, being a bias in funding towards 'solving bottlenecks through infrastructure', and the national level having significant influence on the local level, whilst itself being hardly influenceable by the other levels. It also further explores the ways to overcome these conflicts: 1) shifting the focus from 'infrastructure' to 'broad mobility' (e.g., enhance the number of 'innovation projects', such as Urban Living Lab experiments, to learn how to tailor mobility solutions in practices according to local circumstances); and 2) institutionalizing multi-level co-development (e.g., 'MoVe'-the Dutch national-local collaborative programme on urban development).

Chapter 3 gives an overview of the role of data in urban mobility policy assessments through a systematic literature review, focusing on 74 papers in more detail. This study answers research questions about the current role of big data in sustainability assessment of urban mobility policies, whether some types of data are found more useful than others, and whether big data are increasingly employed and found more useful than traditional survey data. The results show that to date academic

literature provided limited insight in new data developments in policy practice and that the new types of big data offer new opportunities for evidence-based policy-making but cannot replace traditional data (surveys and statistics). Moreover, the study suggests that combining big data with survey and Geographic Information System data in ex-ante assessments, as well as in developing decision support tools can support mobility policymaking more effectively. Further studies should engage with policy practitioners to reveal best practices, constraints, and the potential of more demand-driven data use in mobility policy assessments.

Chapter 4 builds on chapter 3 with a study that zooms in on data use in urban mobility policymaking practice in two Dutch cities - Maastricht and Groningen. These cities have trialed a more data-driven policymaking approach, funded through a national programme (BeterBenutten). Ten semi-structured interviews with the people working in the mobility departments and document analysis of twenty-one policy reports were conducted to understand how data is currently embedded in urban mobility policy- and decision-making and what the advantages and limitations of more data use are in these processes. This study finds that data use differed in long-term and short-term policy cycles. (The main difference between the two cycles is that the long-term cycle needs to go via the transport policy steering group). In the long-term policy cycle (which usually takes four years or longer), data was regarded as less important than political and societal trends and developments. In the short-term cycle, data played a major role in prompting traffic regulations and policy adjustments. Insights about how data could be more effectively used in sustainable urban mobility policy practice delivered in this research include: (1) Support from national/regional level (e.g., the BeterBenutten program) could provide extra opportunities for local governments to do ex-post policy assessments, which are regarded as valuable resources for evidence-based decision-making by policymakers. (2) Survey data still play a significant role in urban mobility planning by providing more insight in the 'why' of traveller behaviour than big data. (3) Transport policymakers need to strengthen their abilities in selecting suitable data (out of a much larger set) and having more (competent) personnel capacity to interpret data. (4) Promoting sustainable mobility is a strong driving force for the local governments to enhance data use.

Chapter 5 further focuses on how to help transport mobility policymakers increase their capacities to use and interpret data. The literature indicates that GIS-based transport models are functional, cost-efficient and user-friendly tools for (urban) mobility planning (Abousaeidi et al., 2016). They are currently available for a broad range of applications in mobility planning. However, it is not known how widespread the current use of GIS models is among European urban mobility planners, nor what their user experiences and needs are. There is therefore a risk that the development of GIS models for urban mobility planning will be mainly driven by technical possibilities and data availability rather than by the needs of the prospective users. To inform model developers and ensure a good match between model options and user needs, we conducted a survey investigating the current application of GIS models in urban mobility planning practice in Europe as well as model data availability and the needs and priorities of European mobility planners regarding GIS models. We received 51 valid responses from the transport departments of 42 cities from 21 European countries. For developers of GIS-based traffic models, the findings indicate that in Europe there is scope for wider adoption and further improvement. The models currently used are considered useful to support urban mobility planning, but more than 60% of the surveyed cities do not yet use them. Increased user-friendliness, in particular for non-experts, appears important to promote wider adoption. Availability of non-traditional types of data, such as real-time data or data at neighbourhood level, is still limited in most cities, but this may rapidly change.

Additionally, there is also considerable interest in traffic models that integrate social and environmental aspects.

Finally, a synthetic discussion is provided in chapter 6 about the current role of data and how data can more effectively support urban policymakers in sustainable urban mobility transformation. Overall, this thesis concludes that big data bring new opportunities for sustainable urban mobility policymaking (e.g., it allows mobility policymakers to evaluate policy measures targeting different modalities), while survey data give more in-depth information about why travelers choose the corresponding modalities. However, data, especially big data, are not widely used in urban mobility policy practice. The main reason is that urban policymakers lack the needed financial support and capacity to process data. This requires support from other governance levels, such as the EU Open Data Directive. Sustainability and climate policy ambitions are bringing more alignment between the governance levels in terms of sustainable mobility policy aims, which could help to support the urban level. In addition, shifting the higher governance levels' (supranational and national) funding focus from infrastructure to broader mobility solutions could better support the use of data in sustainable urban mobility policymaking. Another opportunity would be the further development of GIS-based traffic models according to the needs and requirements of urban mobility policymakers.

Although our study filled several gaps in the literature, there are many gaps left, which indicate possible future research directions. The first concerns clarifying the most effective role and involvement of different actors in sustainable urban mobility policymaking. This is also flagged by Ronzhyn and Wimmer (Ronzhyn and Wimmer, 2021). Walravens et al. (2021) also highlighted that collaboration among different actors is required to enable data-driven policy making (Walravens et al., 2021). Our interviews with respondents at different governance levels as well as from the two case study cities, indicated that involving and collaborating with a broad range of actors is required to make sustainable and data-driven urban mobility policymaking effective. Future studies should clarify how this collaboration can best be organized.