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Workshop Synthesis: Improving methods to collect data on dynamic behavior and processes

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Abstract

This paper summarizes the findings from the workshop "Improving methods to collect data on dynamic behavior and processes". This workshop focused on the scope, strengths and weaknesses of traditional and innovative survey methods used to capture dynamics in travel behaviour and on the identification of future research priorities. This paper gives an overview of the process followed by the workshop, presents the definitions of technical terms adopted to facilitate the spoken exchanges in the workshop, describes the current state of research on topics that were selected for discussion by the participants, and looks ahead to future research

1. Purpose and introduction

Advanced methods in modelling and planning increasingly require longitudinal information for capturing the dynamics of travel behavior and underlying decisions. Activity-based models represent the activity patterns of individual agents over at least complete weeks (Goulias et al, 2013), incorporating multiple attributes and determinants such as influences of social networks on the agents' travel behavior (Hackney and Axhausen, 2006).

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Strategic visions and policy packages in transport planning are becoming more complex. Goals such as smart, sustainable or multi-modal cities require a multitude of information for their implementation and evaluation. For example, many cities make substantial efforts to promote travel by the active modes walking and cycling: longitudinal data about walking and cycling trips and stages help to design interventions that reach the chosen goals efficiently.

For decades, improving panel, pseudo-panel and repeated cross-section designs have been central to the methodological discourse and to the ISCTSC-conference publications (see e.g. Ampt 2013, Golob et al. 1997, Murakami et al. 2007, Zumkeller and Ottman 2009). The toolkit of methods is expanding: in particular, recent developments make it possible to extend the period of observation, where useful, to months and even years (Moutou et al. 2014). Mobile data collection technologies are more and more appropriate for observing behavioral dynamics and processes, and they are increasingly ready for real-world applications (Kopp et al. 2015). The proportion of persons and subgroups in the population that own mobile devices such as smartphones and/or are familiar with these technologies is high and growing. Concerns about selection bias are therefore declining. Representative samples might even be recruited more easily when technology-aided options for data collection are offered to respondents. Moreover, various new passive data sources such as mobile phone data or data from ticketing systems are available, and many stakeholders support open data policy so that data availability is improving.

Overall, on the one hand, data needs are high and include data that have been collected only rarely in past travel surveys, such as longitudinal patterns, stages, subjective behavioral determinants or routes. On the other hand, opportunities to implement data collection are also increasing.

Building on the findings of previous ISCTSC conferences, this workshop focused on the scope, strengths and weaknesses of both traditional and innovative survey methods used to capture dynamics in travel behavior, and to identify future research priorities. In particular, it addressed the challenges and opportunities of evolving strategies to capture the dynamics of travel behavior over different time horizons, including reducing data limitations from classical designs, and issues, such as burden, that are related to data quality.

Intra-personal dynamics was chosen as the main focus, but inter-personal dynamics were included in the discussions.

The second section of this paper summarizes the process of the workshop. Section 3 presents the definitions of technical terms adopted to facilitate the spoken exchanges in the workshop, and summarizes the main findings from the workshop discussions on the strengths and weaknesses of the different survey types. The current state of research, open questions, challenges and opportunities are discussed in Section 4 for four research topics that were chosen for in-depth discussion within the workshop. A concluding section focuses on the outlook for future research on the improvement of methods to collect data capturing the dynamics of travel behavior.

2. The workshop process

The workshop discussions were initiated by four paper presentations. Streit et al. (2014) presented the approach and results from adaptations in the survey method for the German Mobility Panel (GMP). New methods for recruitment were tested and for the first time, respondents were offered online questionnaires as one alternative in addition to the written diaries. Olde Kalter et al. (2014) gave an overview of the new Mobility Panel for the Netherlands (MPN) that started in 2013. The respondents in the MPN report their trips over three diary days in contrast to the GPM where they are expected to fill out weekly diaries. In addition to the standard travel survey questions, the MPN includes various questions that are meant to give a more complete picture of travel behavior and its determinants including motivations, barriers and attitudes. Moutou et al. (2014) described work on the influence of life-change events on daily travel patterns. They used a unique GPS-dataset collected by the Institute of Transport and Logistics Studies (ITLS) of the University of Sydney for four Australian cities between 2005 and 2012 for this research. Aultman-Hall et al. (2014) introduced a web-based one-year longitudinal panel survey of overnight travel with a focus on the lessons learnt from recruitment and survey design.

After the presentations, the terminology, strengths and weaknesses of different survey types and data requirements were discussed. The main results of this discussion are presented in Section 3. In the next step, the workshop participants split and two rounds of group work followed.