Multimodality in Austria
The connection between mobility behaviour and mobility supply

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1 Motivation and objectives

Multimodal mobility behaviour means using different modes of transport within a given period of time. By doing this, multimodal travellers utilize the advantages of different modes of transport for specific trip features and framework conditions such as trip purpose, weather condition, time pressure or mode availability. Multimodality is often associated with shifting car dominance towards a more diverse use of different sustainable modes of transport and thus has an eco-friendly connotation (Nobis 2007, Chlond et.al 2000).

Factors influencing mode choice decisions can be distinguished in supply-side and demand-side ones. While supply-side refers to the available (public) modes of transport and their characteristics, the demand-side covers all aspects related to the traveller. Among others, Heinen and Chatterjee (2015) and Von der Ruhren et al (2003) analysed factors influencing multimodality. Both studies focused on revealed mobility behaviour representing the demand-side, without considering the mobility supply.

The objective of this paper is to analyse all spheres of influence on multimodality: besides (i) the supply-side and (ii) the demand-side, we additionally (iii) include an in-between category referred to as "personal mobility tools" describing private-owned mobility enablers such as a driving licences, a public transport season card or an own car. Besides, we consider (iv) interactions between these categories.

2 Data sources

The data source used for this paper was provided by a Mobility Activity Expenditure Diary (MAED) survey (Rösel et.al. 2015), which is a mail-back survey with phone support and incentives. The net population comprises all Austrian employees (49 percent of the Austrian population); the participants were recruited by means of a stratified sample procedure. The representative sample covers 748 persons. They were asked to report all trips and activities over the course of 7 consecutive days.

In order to capture mobility supply, we annotated data from a routing information system, a travel cost model, and a geographic information system (GIS). From these sources we obtained for each trip (i) the public transport service quality (availability, cost, service intervals, service duration, time of service begin) and (ii) possible parking restrictions at the time and location of arrival (existence, fees, maximum parking duration and parking times).

3 Analysis

First, we developed a measurement concept for the modal variability of a person over a period of one week. We started from a well-established Austrian indicator defined in the project OPERMO (Operationalization of multimodality in passenger transport in Austria, 2014), but introduced additional criteria to exclude short distance walking trips (< 500m) since otherwise almost everybody

has a multimodal mobility behaviour. The modified indicator is a dummy variable that separates monomodal car drivers from individuals, who are either multimodal or monomodal bike, walk or public transport users during a period of one week.

In the next step, we developed a series of binomial logit models, which predict the probability of *not* being a monomodal car driver in dependence of (i) only supply-side factors, (ii) only demand-side factors, (iii) demand-side factors and mobility tools as well as (iv) interaction effects between the aforementioned factors (Figure 1). We decided to distinguish only monomodal car-users since only very few monomodal PT users, cyclists or people who only walk were in our sample. This procedure provides a rich picture about the importance of the supply-quality for multimodal travel behaviour both in absence of and in addition to demand-side factors.

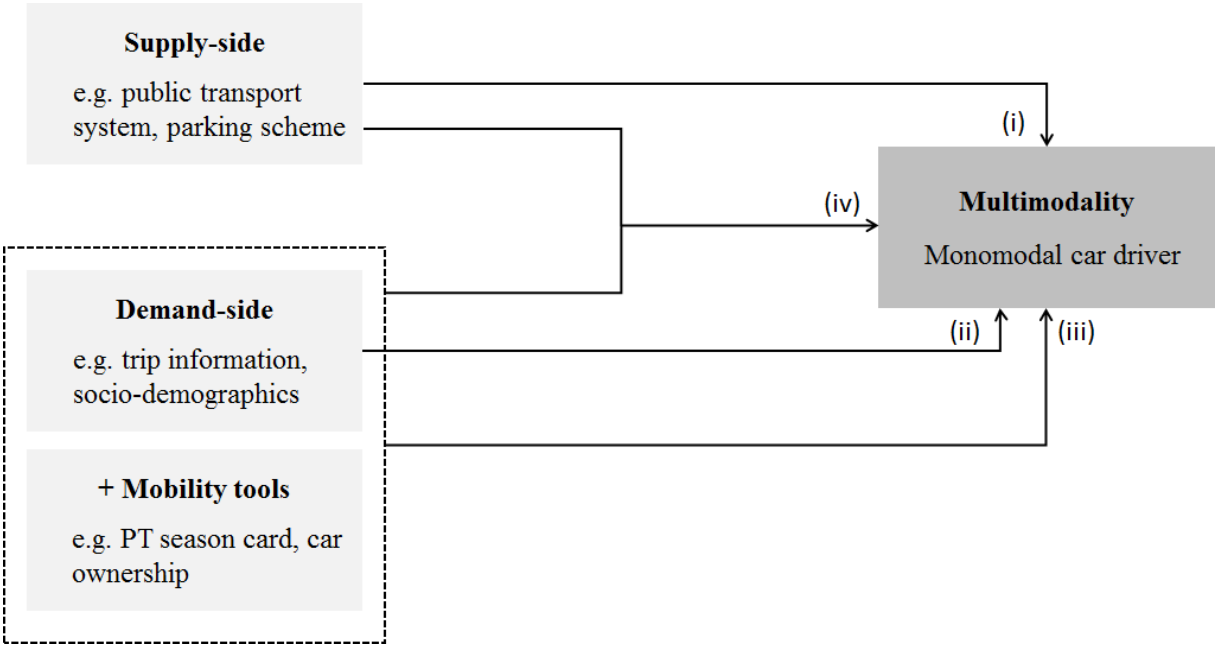

Figure 1: Modelling approach

4 Preliminary findings

The supply-side factors that significantly increase the probability of monomodal car use are the availability of a parking space at the working place, the absence of parking restrictions in public space at time and place of arrival, long access time to public transport and high cost of public transport. The supply-side model reveals a McFadden Rho-Squared of 0.15 which means a sufficient model quality.

The demand-side model predicts the highest probability of monomodal car use for people living in a suburb, living in the region of Carinthia, being male and older than average, being not accompanied on any trip by either the partner or other non-household persons (defined as mean of the number of persons accompanying per trip). The probability of monomodal car use decreases with an increasing number of trips and increases with an increasing trip distances (defined as median of the trip length of all trips). McFadden Rho-Squared accounts for 0.16.

If mobility tools are also taken into account, the resulting measurement of fit increases to 0.28. This model also includes the variables “bicycle available in the household” and “PT season card ownership” – both decrease the probability of being a monomodal car user, while a car or motorcycle license increases the probability of being a monomodal car user.

5 References

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