Effects of changes in parking supply on travel behavior (VSS1997/046)

Einfluss von Änderungen des Parkierungs-Angebotes auf das Verkehrsverhalten

Funding: National (Switzerland)
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Status: Complete with results

Background & policy context:
Parking supply is an important element of urban transportation policies. It is assumed that parking supply influences choice of mode, choice of destination, trip frequency and trip chaining and that it determines the accessibility of urban destinations (e.g. shopping). Till today, transportation planners in Switzerland have no instruments available to forecast the impacts of changes in parking supply on travel behavior and accessibility.

Objectives:
The project aims at closing this gap. Using stated-choice-methods a model of travel behavior shall be established which can be used to forecast the impacts of changes in parking supply on travel behavior and accessibility of the areas affected by the measures. A further goal is the demonstration of the practical application of the stated-choice-method, which could be used for many other transportation studies in Switzerland.

Further objective is a demonstration of the practical application of the stated preference method for transport in Switzerland.

Methodology:
In the research of the impact of changes in the parking-range is examined on travel behavior and on the favorable location of a destination, and displayed with discrete choice models. The focus is on situations in central areas with mixed use. Since it can attract a sufficient data base for modeling the changes in the parking-offer on travel behavior with the traditional methods of traffic monitoring hardly been conducted surveys stated preference (SP).

With the aim of a broad spectrum of study contexts related to urbanity, attractiveness of destinations, development by PT and the LV, the amount of parking fees, etc. ensure parking facilities in a small, a medium and a big city were chosen as study contexts, Case studies were open to the public and managed parking facilities in the center of Frauenfeld (small town), in the center of Schaffhausen (bigger town), and the parking garage Urania in Zurich (big city).

In the parking facilities incoming vehicle driver were randomly selected and interviewed. Based on a questionnaire sociodemographic data and information on the currently performed way (Revealed Preference data) were collected. Of those individuals who agreed to participate in the Stated Choice experiments, the addresses were listed.

With the data of Stated Choice experiments the observed choice behavior with multinominal logit models (MNL) were separately displayed for each case study. Only the data from the Stated Choice experiments were (SP) data used in the first step. In all cases, the parameter estimates modeling approaches revealed with sufficient explanatory power. The additional consideration also raised in the initial questioning sociodemographic data (RP-Data) brought this regard no significant improvement of the estimated model approaches. The models show that the parking fees as well as the search and waiting time have a significant influence on the choice of the parking facility, the means of transport and the destination.

To estimate the impact of the Parking-offer to the favorable location of an area was estimated with the decision models created in the previous step, as many of the previous user of the investigated parking facility would choose with rising parking fees another destination.
Parent Programmes:
ARAMIS - ARAMIS information system

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Partners:
Switzerland
Swiss Federal Roads Office
Ingenieur und Planungsbüro Paul Widmer

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Key Results:

This study examines traveler response to changes in parking supply and pricing in urban centums with mixed land uses. Stated Preference Methods are used to collect data for the estimation of discrete choice models.

In order to obtain a broad spectrum of study contexts in terms of types of urban areas, attraction of locations, quality of transit services, accessibility for pedestrians and cyclists, level of parking fees etc. parking facilities in the centrum of a small, a middle sized and a big town were chosen as case studies.

The case studies are: (1) public parking lots in the centrum of Frauenfeld, (2) public parking lots in the centrum of Schaffhausen and (3) parking garage Urania in Zurich.

Data were collected in two stages. First, a random sample of drivers arriving at the parking facility was chosen. Socioeconomic data and details of the actual journey were collected with the help of a questionnaire "face to face" (revealed preference data). Of those people who agreed to participate in the following stated preference survey the addresses were noted.

With the data obtained in the SP experiments for each case study, multinomial logic models (MNL) were estimated to model the revealed choice behavior. In a first step SP-data was used only. For all cases models with reasonably high rho squared indexes and statistically significant parameters could be obtained. Adding RP data to the model estimation did not improve the model quality significantly the models reveal the importance of parking fees and of search and waiting time as variables, which strongly influence the choices of the parking facility, mode and destination.

To answer the question on how the attraction of a location might be affected by more stringent parking policies (higher parking fees and/or a reduction of parking supply), the estimated models were used to estimate the share of customers choosing alternative destinations when parking fees increase (the same calculations could be done for decreasing parking supply).

Elasticities of demand, as measured by number of cars parking, with respect to area wide changes in parking price and with respect to changes in search and waiting times for a tree parking space, were calculated for the avarage situations resulting from the SP experiments (which have higher levels of parking prices and higher levels of search and waiting times than in the real situation). For Frauenfeld the calculated elasticities are -0.3, for Schaffhausen -0.5 and for Zurich -1.0.

Documents:
21104_1103_Inhalt.PDF (Final report)

STRIA Roadmaps: Network and traffic management systems, Smart mobility and services
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