

Preferences for Carsharing-Facilitated Neighbourhoods: a Latent-Class Model

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1 ABSTRACT

One of the most prominent examples of the emerging sharing economy phenomenon is carsharing. Carsharing provides people short-term access to private vehicles without the higher cost and responsibilities that would come with the ownership of a private car. Carsharing programs provide a fleet of vehicles that are parked in a network of locations which are usually located in urban areas with easy access to other transport modes. According to Shaheen & Cohen (2013) the most prominent carsharing business models include: neighborhood residential; business; government and institutional fleets; transit-based; college and university-based; and personal vehicle sharing (use of privately-owned autos employed in shared-use vehicle services). Among these, neighborhood residential carsharing which focuses on mixed-use, urban and residential neighborhoods, is found to be the most common and profitable business model for providers. Residents who live in the neighborhoods with carsharing facilities do not have to own private cars but can use vehicles easily by subscribing to the carsharing service. To use the shared vehicles, residents only need to prebook the cars online before the trip. Once the preparation is done, residents can freely use vehicles until they announce they have finished the using.

According to Chen & Kockelman (2016), travelers who live in dense neighborhoods and join a carsharing service reduce their energy use and emissions. Moreover, in the same study it is found that the demand for parking infrastructure also decreases when travelers chose to join a carsharing service instead of using private owned car. Decreased parking demand can result in obsolete areas in cities which can be transformed into other land uses such as green facilities or more residential buildings. As modern cities are facing challenges such as traffic jam, air pollution, parking tension, urban land use shortage, carsharing facilities in neighborhoods can provide solutions for better living environments and increased quality of life for residents.

In this study, we investigate the willingness of citizens that currently live in urban areas of The Netherlands, to move to a neighborhood with carsharing facilities. For that purpose, a stated choice experiment is designed by considering the attributes of neighborhood residential carsharing: These attributes can be categorized as the specifications of carsharing (carsharing costs, booking time, accessibility to home, parking distance to the destination), specifications of carsharing and housing interacted environment (commuting distance, public transport accessibility, housing location, private parking space, green density, children playing area safety) and specifications of houses (house type, ownership, size, price, built time). For data collection, a panel is used which consists of respondents from the Netherlands. In total 623 respondents are gathered for the analysis.

In order to segment respondents we applied a latent class analysis. According to the results, the 2-class solution gave the best results. Rho-squared is found to be 0.327. The first class is strongly less willing to move to such neighborhoods; the second class is willing to live in a neighborhood carsharing. The strongly less willing group is mainly influenced by the dwelling characteristics such as size, cost and building year and neighborhood characteristics such as parking availability and commuting distance. Moreover, this group also prefers living in neighborhoods with carsharing facilities if carsharing has no costs (free). The second group who are willing to move in a neighborhood with carsharing facilities is mainly influenced by carsharing and residential attributes. This group prefers carsharing that has no cost with little booking time and 5 min walking distance to home. Moreover, just as the first group, they prefer dwellings with bigger living environments and lower costs. However, the influence of these dwelling preferences on their willingness to live in a neighborhood with a carsharing facility is less than the first group.

These results are useful to identify the right socio-demographic groups, residential environments and develop strategies in order to establish carsharing facilitated neighborhoods.

Keywords: latent-class model, carsharing-facilitated neighbourhoods, stated choice experiment, model, estimation

2 REFERENCES

Chen, T. Donna, and Kara M. Kockelman: Carsharing's life-cycle impacts on energy use and greenhouse gas emissions. In: Transportation Research Part D: Transport and Environment. Vol 47, pp. 276-284, 2016.

Shaheen, Susan A., and Adam P. Cohen: Carsharing and personal vehicle services: worldwide market developments and emerging trends. In International Journal of Sustainable Transportation Vol. 7.1, pp. 5-34, 2013.

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