CONSUMER PREFERENCES FOR INNOVATIVE MOBILITY CONCEPTS IN GERMANY

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Overview

Carbon reductions in the private transport sector require various measures to adjust behavior and to set incentives for innovative concepts. Market introduction of electro mobility seems to be a suitable alternative for conventional vehicles. However, simply substitution of combustion engines with electric motors is insufficient to adapt for climate change. Substantial reduction of external effects of mobility requires comprehensive actions. On the demand side preference structures for goods and services for electro mobility comprise several attributes with different impacts on the willingness to pay for electric vehicles and shared mobility. Empirical understanding of how these attributes interact and affect consumer behavior is limited. This study aims to examine the willingness to pay of car users in Germany for attributes of different types of electric vehicles and for car sharing in order to derive recommendations for marketing these goods and services. A discrete choice experiment is used to estimate marginal willingness to pay for changes of single attributes of mobility products and services related to electric vehicles. The results identify supportive factors and barriers for further market introductions of electro mobility. Such information is useful for the development of business models for electro mobility and shared mobility. These extended business models are required to introduce new mobility products and services into the market considering heterogeneous preference structures and dynamic demand. On the demand side, the study investigates individual preferences and calculates willingness to pay values. On the supply side, recommendations are derived form the empirical results based on the estimated preferences to adjust business models for electro mobility.

Methods

The study is based on a survey of 405 car users in Germany and applies a discrete choice experiment with the attributes price, power, running costs, bonus, range and availability of charging stations. The design of the discrete choice experiment was developed with focus groups. A Latent Class model was used to analyze socio economic determinants of the willingness to pay for single attributes. The emphasis is on valuation for single attributes of products and services on markets for electro mobility. The choice is between several types of vehicles and services such as car sharing in different combination of mobility systems. The estimated willingness to pay values for the attributes and the correlations with socio-economic variables such as age, sex, income, and living situation are used to evaluate different business models for electro mobility. The discrete choice experiment constructs a hypothetical market situation and therefore provides approximate parameters for the demand function which can be used in the business models in order to skim individual preferences for single attributes and levels and to adapt marketing of business models to revealed preferences.

Results

The class membership probability is partly influenced by the socio-demographic variables. Only age and rent have a statistically significant impact on class membership. Younger respondents and those who have rented an apartment are more likely to be member of class 1. Especially house ownership status makes a large difference. A person renting a house has a probability of about 10 percentage points more than a person who owns a house. In class 1 younger respondents and tenants have stronger preferences for electric vehicles, while in Class 2, preferences for conventional vehicles and car sharing are high. The implications for business strategies indicate that price; range and availability of charging stations are important parameter for the use of electric vehicles and should be integrated in various business models especially for younger people living in cities.
With respect to the attributes, preferences vary between classes mainly in magnitude and significance, but not in direction. In both classes, people prefer lower purchasing prices and running costs, and are indifferent towards

power. However, class 1 has significant and positive parameters for availability of charging stations and range, while these parameters are not significantly different from zero in class 2. This finding reveals that class 2 members are not interested in electric vehicles. If a respondent does not consider buying an electric vehicle or range extender, range and availability of charging stations do not matter. The parameters regarding the bonus attribute provide a rather ambiguous picture. There is a negative preference for Park & Ride and Bus Lane and no significant effect of free parking spaces. The negative effect could be due to some respondents not agreeing with policies that give privileged rights to electric vehicle. People also are not more likely to choose an electric vehicle if privileges are present. The attributes range and charging infrastructure determine the willingness to pay significantly. Moreover, younger people and tenants are more likely to opt for an electric vehicle, and lower prices are the most convincing argument to buy an electric vehicle.

Conclusions

The results of the discrete choice experiment illustrate various effects on business models for electro mobility. For example, value creation for drivers of electric vehicles can be achieved by sharing energy with others, for example in parking lots or shopping malls for peak demand reduction. This additional value creation requires detailed knowledge on driver behavior because offers for drivers of electric vehicles and for users of power provided by these cars should be segmented in order to meet both consumption patterns (Maekinen et al. 2019: 245). Business models for electro mobility considering this option of shared value will reduce user costs for drivers of electric vehicles if the willingness to pay of users for this shared capacity can be absorbed. These findings illustrate technological progress reducing charging times and expanding the range of electric vehicles as important infrastructure conditions for market penetration of this product. Investments in charging infrastructures together with the provision of suitable information for users on improvements are important conditions to increase acceptance of electro mobility (Junquera et al. 2016: 12).

References

Junquera, B. Moreno, B., Álvarez, R. (2016), Analyzing consumer attitudes towards electric vehicle purchasing intentions in Spain: Technological limitations and vehicle confidence, Technological Forecasting & Social Change (109): 6–14.

Maekinen, S.J., Valta, J., Kotilainen, K., Saari, U.A. (2019), Prosumers' Digital Business Models for Electric Vehicles: Exploring Microfoundations for a Balanced Policy Approach. A. Aagaard (ed.), Digital Business Models, Palgrave Macmillan: 227–254.