

FACTORS AFFECTING THE CONSUMERS' PREFERENCE ON ELECTRIC VEHICLES: A KOREAN CASE

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Overview

Recently, global warming has become a worldwide problem and countries are making efforts to reduce carbon emission. In particular, it is known that the transportation sector has a significant impact on the reduction of carbon dioxide emissions, and the development of base technologies has led to the commercialization of electric vehicles. As a result, electric vehicles are recognized as one of the key technologies for carbon emission reduction. However, compared to other developed countries, Korea still has a lower rate of electric vehicle penetration. Therefore, it is necessary to know consumers' preference of electric cars and environmental awareness for successful diffusion of these electric vehicles. The purpose of this paper is to identify the environmental friendliness and attitudes toward the vehicle characteristics of Korean potential electric vehicles consumers and to analyze the factors that significantly affect the preferences of electric vehicles.

Methods

The research is based on the results of survey conducted in Korea. A total of 1251 Korean consumers with a stratified sampling by taking into account the national ratios of gender, region and age responded to the survey. The questionnaire consists of four categories : (1) 'attitudes towards cars', (2) 'attitudes toward the environment', and (3) 'factors to consider when buying a car', and (4) 'car choice game' between EV and ICEV. Using the survey result, we apply multinomial logit model(MNL) to find attributes which are significantly influential to the choice of EVs. Furthermore, the factor analysis is used to extract the intrinsic features and eliminate multi-collinearity of the questions in each category. Finally using K-means clustering, we grouped them into people with similar characteristics, and examined the response of each group to the purchase of EV.

Results

Applying MNL to the car choice game, we found that price, charging time, and the number of charging station are important elements to induce consumers to purchase EVs. Nine scenarios were constructed with different levels of these three elements, and MNL was applied to find the attributes which are significantly influential to purchase EV. It is found that there were few questions that affect significantly due to the correlations of between questions, except the vehicle eco-friendless in 'factors to consider when buying car' category. By using factor analysis, we obtained new characteristics from each of the survey categories. Driving propensity can be represented as two factors whereas environmental concerns and vehicle purchase factor can be merged into three factors. We applied MNL again to the new factors from factor analysis and obtained several meaningful attributes that affect EV preferences. In addition, we found the demographic features of consumer groups who are more plausible to have EV in mind to purchase.

Conclusions

In this study, we found the most important specification of EV to increase market share: price, charging time, and the number of charging station. Also, we concluded that consumers who prefer EVs in the Korean vehicle market place a high importance on environmental friendliness and vehicle usability as well as have more future-oriented mindset. Thus, in order to increase EV penetration rate as a part of the solution of the carbon emission reduction in transportation sector, Korean government and vehicle enterprises should take note of it and try to invest appropriate area of EV technology to attract consumers.

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