Consumer purchase intentions for electric vehicles: Is green more important than price and range?

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In view of global warming and climate change, a transition from combustion to electric vehicles (EVs) can help to reduce greenhouse gas emissions and improve air quality. However, high acquisition costs and short driving ranges are considered to be main factors which impede the diffusion of EVs. Since electricity needs to be produced from renewable energy sources for EVs to be a true green alternative, the environmental performance of EVs is also presumed to be an important factor. This paper investigates the role of environmental performance compared to price value and range confidence regarding consumer purchase intentions for EVs. To develop our hypothesis, we interview 40 end-user subjects about their beliefs toward EVs. Then, we perform 167 test drives with a plug-in battery EV and conduct a survey with the participants to test the hypothesis. Results of a structural equation modeling support the hypothesis that the environmental performance of EVs is a stronger predictor of attitude and thus purchase intention than price value and range confidence.

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1. Introduction

Increasing greenhouse gases (GHG) are considered as the major challenge for global warming, climate change, and air quality (Intergovernmental Panel on Climate Change, 2008, p. 39; National Academy of Sciences, 2005). Transport accounts for 23% of worldwide carbon dioxide (CO2) emissions which are an important ingredient of GHGs and contribute to global warming, and three quarters of these are generated by road transport (International Energy Agency, 2016). In this context, electric vehicles (EVs) are considered to have the potential to reduce CO2 emissions substantially, given that electricity is produced from renewable energy sources (Asamer et al., 2016; Bickert et al., 2015; Khoo et al., 2014; Mersky et al., 2016; Zhang and Yao, 2015). From an economic perspective, compared to combustion vehicles, the main factors which impede the diffusion of EVs are high acquisition costs and limited driving range due to insufficient battery technologies (Busse et al., 2013; Pasaoglu et al., 2014; Wagner et al., 2013). Regarding McKinsey’s EV index that assesses a nation’s readiness to support an EV industry based on supply and demand, as of January 2012, the leading countries in the field of electric mobility in descending order are Japan, the United States, France, Germany, and China (Krieger et al., 2012). Among automotive manufacturers, there is a competition to lower operating costs and lower CO2 emissions. The global market for EVs is expected to grow from 137,950 vehicles in 2012 to 1.75 million in 2020 (Hurst and Gartner, 2012).

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