

GENERATION Z READY TO EMBRACE THE ELECTRIC VEHICLE REVOLUTION? PREDICTORS OF ELECTRIC VEHICLE ADOPTION BY YOUNG AND OLDER ADULTS IN AUSTRIA

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Overview

The transport sector is a key contributor to climate change and according to forecasts the emissions of that sector will continue to increase. One possible innovation put forward in recent years to help reduce emissions in this sector are electric vehicles (EVs). Besides technology advancements, consumer acceptance is crucial to ensure a successful transformation towards lower emissions. In this respect the “consumers of the future” draw particular attention and it is therefore that the present study – building on a survey of Austrian citizens and value belief norm (VBN) theory – analyzes willingness to purchase an EV in two subsamples, young adults (18-30) and older adults (31-70). The findings of the present study indicate that, in line with previous work, only psychological as opposed to socio-demographic factors yield significant contributions to the models predicting EV adoption. Positive technology-related attitudes towards EVs have a significant impact on willingness to purchase in both subsamples. Furthermore, skeptical attitudes towards EVs as well as beliefs with respect to renewable energy technologies (RET) in general are significantly associated with willingness to purchase an EV. In terms of differences between the subsamples social norms related to RET and energy use as well as social dominance orientation significantly contribute to the model in the older adult subsample only. We discuss implications of our findings for future research, marketing and policymaking with a specific focus on the young generation as future EV adopters.

Methods

For the present perceptions and preferences regarding RET and EVs data was gathered in two online surveys conducted in October 2017 in Austria. The total sample was split into a young adults sample ($n = 452$, 18-30 years) and an older adults sample ($n = 798$, 31-70 years). The online survey contained a variety of items and scale measurements, with a subsection of the questionnaire focusing in particular on issues surrounding EVs, such as the respondents' experience with EVs and their willingness to purchase an EV, our dependent variable. The latter question asked survey participants to indicate their general preference with respect to the vehicle type in a scenario related to a potential future car purchase (e.g., diesel, gasoline, hybrid, electric, etc.). If “electric” was selected participants were scored as 5 (very high willingness to purchase an EV). All other respondents were asked a follow up question to investigate whether they would also consider purchasing an EV on a 4-point Likert-type scale ranging from 1 (not likely at all) to 4 (very likely) and were scored accordingly. As predictors different socio-demographic and socio-psychological data were included in the regression models. This included: gender, age, education level; *social dominance orientation* ($\alpha = .74$) measured through a scale of eight items, 10 items measuring *positive attitudes towards EVs* subdivided into *technology-related* ($\alpha = .80$) and *image-related* positive attitudes towards EVs ($\alpha = .71$) and 13 items measuring *negative attitudes towards EVs* subdivided into *technology-related* ($\alpha = .82$) and *image-related negative attitudes towards EVs* ($\alpha = .80$). Furthermore *beliefs with respect to RET* were measured through nine items split into an *RET optimism* scale ($\alpha = .83$) and a *RET skepticism* scale ($\alpha = .54$). Social norms were measured as *RET social norm* (three items; $\alpha = .81$) and *energy use social norm* (four items; $\alpha = .73$). Finally, one item measuring *EV experience* was included too. Multiple linear regression analysis was applied estimating two separate models for the above described subsamples.

Results

We find different predictor patterns for EV adoption among young and older adults in Austria. Overall, socio-demographic factors do not seem to play a significant role in explaining differences between EV adopters. The model for the young adults subsample explains 21% of the variance. Positive technology-related attitudes towards EVs have a significantly positive effect on EV purchase intention ($\beta = .24$, $p < .000$), in contrast to positive image-related attitudes towards EVs ($\beta = .11$, $p = .05$). Second, negative image-related attitudes towards EVs are, as expected, negative predictors of EV adoption ($\beta = -.20$, $p = .001$). Our sub-scale measuring technology-related negative attitudes towards EVs has, on the other hand, a negative but non-significant effect on our dependent variable ($\beta = -.08$, $p = .16$), which is also the case for our sub-scales RET social norm ($\beta = -.001$, $p = .98$) and RET optimism ($\beta = .09$, $p = .10$) that relate to general beliefs towards RET. Results further show that a general RET skepticism significantly decreases the willingness to purchase an EV ($\beta = -.12$, $p = .03$). Further scales included in this model were not significant predictors of EV adoption of young adults in Austria (social norm with

respect to energy use ($\beta = -.06$, $p = .27$), social dominance orientation ($\beta = .06$, $p = .27$) and EV experience ($\beta = .05$, $p = .31$). To summarize, in our subsample of young adults positive technology-related attitudes towards EVs, negative image-related attitudes and a general RET skepticism are significant predictors of EV adoption. The regression model for the older adults sample performed slightly better, explaining 26% of the variance. Results with respect to technology and image-related positive attitudes towards EVs are very similar to the ones found for Austrian young adults ($\beta = .26$, $p < .000$ and $\beta = .09$, $p = .05$, respectively). This also applies to the results for our two negative attitudes towards EVs sub-scales: image-related ($\beta = -.18$, $p < .000$) and technology-related ($\beta = -.08$, $p = .09$). Second, related to general beliefs towards RET we see that RET social norm ($\beta = .17$, $p < .000$) and RET skepticism ($\beta = -.15$, $p < .000$) are significant predictors of EV purchase intention among older Austrian adults, whereas the coefficient for our RET optimism sub-scale is positive but non-significant ($\beta = .06$, $p = .15$). In contrast to the regression results for the younger generation, we find social norm with respect to energy use ($\beta = -.10$, $p = .01$) and social dominance orientation ($\beta = .08$, $p = .02$) to be significant predictors in the young adults' subsample. To summarize, the results show, similar to the findings for the young adults subsample, that positive technology-related attitudes towards EVs, image-related negative attitudes and a general RET skepticism are significant predictors of the willingness to purchase an EV. Additionally, we find that social norm regarding the general use of RET, energy use social norm and social dominance are significant predictors of EV purchase intention of Austrian adults.

Conclusions

It is integral to include the future user into the early development process (Himmel et al., 2014) in order to successfully increase the acceptance of EVs. Our study is the first to provide insights on EV adoption and potential purchase predictors of young adults. Building on VBN theory (Stern, 2000) we measured a series of psychological constructs and applied multiple linear regression analysis to predict willingness to purchase. It is interesting to observe that in terms of positive attitudes it is the technology-related qualities of an EV that count, when on the other hand in terms of negative attitudes, image-related issues seem to discern EV adopters from non-adopters. To our best knowledge this is the first study to offer such a nuanced look at attitudes and their predictive value and future studies will have to investigate whether the here proposed distinction of technology and image-related attitudinal aspects is of value to further illuminate EV-adopter profiles. Furthermore, we acknowledge that the construct of social dominance orientation might appear far removed from the decision of whether to buy an EV or not. However, the finding, that besides the conceptually much more closely related attitudinal predictors in the model it is indeed associated with the dependent variable, yields an intriguing glimpse at the potentially much more deeply rooted levers to trigger the purchase of an EV. In our understanding this is a clear call to consider more superordinate psychological constructs, besides the often overly self-evident relations with closely related constructs such as attitudes to EVs, which in their own right do however offer value if a more nuanced scope is applied. Our finding of unique predictor sets for the two subsamples is in line with results from other studies that support the idea of a unique typology of young mobility users. It has been shown for example, that young people are less likely to get a car license at all and generally drive less (Kuhnimhof et al., 2011; Raimond & Milthorpe, 2010; Sivak & Schoettle, 2011, 2012). Combining this with the fact that the average car is parked 92% of the time so that its capacity is not nearly optimally used (MacArthur et al., 2015) it becomes evident that new business models are in demand. Future research must therefore widen its scope to include alternative mobility concepts while still including EVs. This shift in focus will be of vital importance to future studies in this domain. Finally, we firmly believe that, the findings presented here supply important insights for marketers and policymakers to better identify and understand potential adopters from the "generation Z". A cohort which holds a unique perspective on the future of mobility and may include a substantial and even more so critical number of potential future EV customers.