Working Paper Sustainability and Innovation
No. S 07/2016

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How to trigger mass market adoption of electric vehicles?

Factors predicting interest in electric vehicles in Germany

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Abstract

Plug-in electric vehicles (PPEVs) have noteworthy potential to reduce global and local emissions and are expected to become a relevant future market for vehicle sales. Both policy makers and car manufacturers have an interest to understand the future PEV user groups, also those beyond the current ‘early adopter’. However, there are only a few empirical results available about potential future PEV users. Here, we use data from a representative survey on PEV interest from Germany to analyse factors that are related to interest in PEVs of private car buyers. Interest in PEV implies a positive attitude towards this new technology and is thus a prerequisite for later adoption. Our results show that technology affinity and the feeling that an PEV can serve the user’s driving need are positively connected to interest in PEVs. Furthermore, persons that connect a strong feeling of independence with conventional vehicles are less likely to be interested in PEVs. Our results indicate that automakers promoting PEVs should focus their marketing on the new yet ready technology in the next years.

Keywords: electric vehicles, early adopter, early majority, market diffusion, consumer behaviour

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1 Data & Methodology

1.1 Data

The data used for the analysis has been taken from a representative survey for Germany that amongst other topics analysed different potential electricity tariffs for future PEV-owners. It was conducted within the iZEUS-project (Zero Emission Urban System – iZEUS) and funded by the German Federal Ministry for Economic Affairs and Energy. It aimed at finding ways to efficiently integrate mobile electrical storage in vehicles utilizing innovative information and communication technologies (http://www.izeus.de/). For the survey 1,017 adult German citizens answered questions on attitudes towards ICPEVs and PEVs as well as the interest in PEV and the intention to purchase an PEV. The data was collected in April 2013 employing an online questionnaire taking advantage of a professionally managed online access panel. The sample is representative for the German population regarding gender, age, level of education, size of household and federal state.

4,017 German citizens were initially invited to participate out of which 1,107 individuals accessed the online questionnaire. 1,017 of these 1,107 people completed the questionnaire (overall response rate of 25 %). The questionnaire included several indicators in order to divide the respondents into four different groups connected to Rogers' (2003) five adopter categories. Here we follow an approach introduced by Peters and colleagues (cf. Peters & Dütschke, 2014; Peters, Agosti, Popp & Ryf, 2011) in which early and late majority are aggregated into one group. Peters et al. (2011) demonstrated the validity of this approach with respect to the target variable "intention to purchase and use an PEV". Participants who confirmed that they own or regularly drive an PEV in everyday life were selected as Innovators. Two further items assessed the general interest in PEVs on the one hand and the intention to buy an PEV within the next 5 years on the other hand. If both items were answered positively, the participant was assigned to the purchase intention group (Early Adopters). If only the interest item was affirmed, participants were classified as interested (Majority). Participants affirming none of the above were classified as not interested (Laggards).

Analysing the data with respect the Rogers classification and the assignment via the Peters and colleagues classification, it turns out that 0.4% of the survey participants can be considered as innovators as their interest is of such high

level that they already own an PEV. Even though this number seems to be quite low it is consistent with the sales share of PEV in Germany of 8,522 units in 2014 or 0.3% of sales (Kraftfahrtbundesamt 2015) Furthermore about 1% of the participants show purchase intention and are therefore classified as Early Adopter. 46% of the participants state to be generally interested in PEVs. They are classified as early and late Majority. 52.6% of the participants are not intrigued at all by PEVs and are hence designated to be part of the Laggard group. Further questions outlined in the questionnaire are concerned with the participants' interest in technology, their willingness to pay for PEVs, and their usage of other means of transport. Usually one-item-measures are used with the exception for the variable "technology affinity". This measure is the average of three items which showed sufficient, albeit not very high internal consistency (Cronbach's alpha 0.59). Education was measured applying the following categories 1 = No school-leaving diploma, 2 = Basic schooling without apprenticeship, 3 = Basic schooling with finished apprenticeship certificate, 4 = Secondary school certificate, 5 = High school diploma, 6 = University diploma; although this variable is ordinal we treat it in the following as a quantitative indicator.

For the following analyses we employed overall 26 different variables from the online survey described above which encompass all socio-economic variables and others on attitudes towards PEVs and electricity tariffs for PEVs (see Appendix for a full overview). In the following tables only the labels of the variables will be displayed due to space reasons. The variables are laid out more thoroughly in the appendix.

1.2 Methods

We use binary logistic regression to predict interest in PEVs and k-means clustering to identify subgroups towards PEV adoption. The binary logistic regression is used in a manual step-wise model selection approach commencing with all variables covering attitude and socio-economic factors enquired in the questionnaire. Information on the power and significance of effects are given by the odds ratio and the Wald statistic, indicating the contribution of individual predictors to model fit. After each fitting round, some variables that had initially been certified having an effect on interest in PEV needed to be removed since their impact on the prediction had diminished under the significance threshold (5%). Encompassing this general effect the

amount of variables attested an impact had shrunk from 26 variables initially inserted into the model to six variables.

The cluster analysis of those interested in PEV is performed by k-means clustering to identify subgroups with the Majority group. The k-means clustering is a rather explorative approach to analyse data since the number of clusters is fixed a priori. The k-means method has been chosen in contrast to hierarchical clustering methods since it is more likely to produce clusters of similar size. In order to choose the best number of clusters, we analysed the solutions for two to five cluster groups and found that the presented version of four groups offers more insights and is easier interpretable than the others. We inserted all socio-economic variables, all variables that proved to have a significant impact predicting interest in PEV in the regression model and two more variables which were the only ones which featured environmental interest (all in all 16 variables). Rescaling all variables to zero mean and unit standard deviation did not qualitatively alter the clusters. After the k-means algorithm had defined the final distribution, the variables were examined by ANOVAs on differences between clusters. Six of the 16 variables were found to differ significantly.

2 Results

First we give an overview on all variables utilized in this study paying attention to socio-economic differences within the adopter groups which were described and laid out in the introduction (cf. research question 1). As only analyzing socio-economic differences between adopter groups is of limited value to develop advice on how to address potential future customers who are interested in PEVs, we secondly use logistic regression to pin down factors that predict interest in PEVs (cf. research question 2). Thirdly we look for sub-groups within the Majority as its members will be the ones that are expected to be buying PEVs if mass adoption is to be triggered (cf. research question 3).

2.1 Adopter groups

Table 1 gives an overview of selected socio-economic and attitude characteristics in regard to PEV interest. The data is divided into the previously introduced adopter groups. The Innovator and Early Adopter groups have been merged in the table due to the small number of observations. Comparing the statistics across the groups the data indicates that the Majority can be seen as a “moderate” version of the Innovators/Early Adopters when compared to the

Laggards. This is apparent for instance in the variables age, education, share of women, share of economically active persons and willingness to pay more for an PEV (WTPM). The results for the Majority group in all these variables are found in between the results of the Innovators & Early Adopter group and the Laggard group.

However, it needs to be taken in account that the size of the three subgroups (Innovators & Early Adopters, Majority, Laggards) differ substantially. Only 14 of the 1,017 participants belong to the Innovators & Early Adopters group, while the Majority contains 468 persons and the Laggards group consists of 535 persons. As we know more about PEV-Innovators and PEV-Early Adopters to date (c.f. Plötz et al. 2014; Peters and Dütschke 2014; Campbell et al. 2012) it would be interesting to further explore the socio-economic and attitude difference between them and the Majority group, however, due to the limited size of the Innovators & Early Adopters group only statistical comparisons between the Majority and the Laggards group can be conducted. Differences between variables were tested via T-Tests and Chi-Square-Tests where appropriate (see Table 2).

Table 1: Socio-economic characteristics and attitudes towards PEV interest (scaled variables)

	Innovators & Early Adopter		Majority		Laggards		total	
Sample size	14		468		535		1017	
Variable	mean	SD	mean	SD	mean	SD	mean	SD
Age	40.9	18.7	48.5	17.0	48.8	16.6	48.6	16.8
Size of household	2.4	1.3	2.4	1.2	2.4	1.2	2.4	1.2
Willingness to pay more (WTPM) (in %)	15.7	15.2	7.6	10.5	2.1	7.3	4.8	9.5
Technology affinity	4.2	1.0	4.6	0.8	4.1	0.9	4.3	0.9
Education	4.4	1.6	4.1	1.2	3.7	1.1	3.9	1.2
Availability ICPEV	4.8	1.4	5.3	1.1	5.0	1.4	5.1	1.3
Independence ICPEV	4.4	1.9	5.4	1.7	5.3	1.3	5.3	1.2
Freedom ICPEV	5.0	1.5	5.5	1.0	5.4	1.1	5.4	1.0
Autonomy ICPEV	5.2	0.9	5.6	0.9	5.5	1.0	5.5	1.0
Availability PEV	3.6	1.9	3.7	1.6	3.0	1.6	3.4	1.7
Independence PEV	3.7	2.2	4.3	1.5	3.5	1.7	3.9	1.6
Freedom PEV	3.6	2.1	4.1	1.5	3.4	1.6	3.7	1.6
Autonomy PEV	3.7	1.9	4.4	1.5	3.5	1.6	3.9	1.6

From a socio-economic point of view we see that the Majority consists of more men, is significantly higher educated, and its representatives are more often working than the Laggard representatives (Table 3). Furthermore they more often possess a driver's license. They feature a higher willingness to pay more for an PEV, have more often a car available at their homes and are more technology affine. Concerning their attitudes in regard to PEVs and ICPEVs the data suggests that members of the Majority perceive the availability, the independence, freedom and autonomy related to PEVs significantly higher as the members of the Laggard group (Table 3). In addition to that they also assess the availability of ICPEVs as being higher in comparison to the members of the Laggards representatives. This is in line with the finding that members of the majority group are also more likely to have a driver's license and to own a car as stated above. All other variables introduced in table one and two were also examined for significant differences. However, there were no further statistically significant differences found.

Table 2: Socio-economic characteristics and attitudes towards PEV interest (categorical variables)

	Innov. & Early Ad.	Majority	Laggards	total
Sample size	14	468	535	1017
Variable	%	%	%	%
Gender (women)	35.7	44.9	57.2	51.3
(Self-) Employment status	71.4	59,6	50.8	56.8
Children in household	21.4	28.1	26.9	27.4
Possession of driver's licence	92.9	94.0	83.7	88.6
Utilization of public long distance transport	28.6	28.4	19.8	23.9
Car availability in household	85,7	86.3	79.6	82.8
Frequency of car use				
1= daily	75.0	67.1	64.6	65.9
2= 1-3 times a week	25.0	27.0	29.3	28.1
3= 1-3 times a month	0.0	3.5	4.5	3.9
4= less frequent	0.0	2.5	1.6	2.0
Area of residence				
1= rural area	14.3	37.2	34.0	35.2
2= suburb	28.6	13.5	17.2	15.6
3= in city but not central	28.6	29.1	32.1	30.7
4= central in a city	28.6	20.3	16.6	18.5
Climate protection as the driving principle when choosing an PEV-tariff	21.4	22.2	18.5	20.3
Full automation as the driving principle when choosing an PEV-tariff	7.1	22.2	19.4	20.6
Compensation as the driving principle when choosing an PEV-tariff	14.3	25.9	26.7	26.2
Easiness to use as the driving principle when choosing an PEV-tariff	21.4	21.4	18.3	19.8

Table 3: Significant socio-economic group differences and attitude characteristics between the Majority and Laggards group

Variables	Majority	Laggards	Sig.
Willingness to pay more	7.6 %	2.1%	**
Technology affinity	4.6	4.1	**
Education	4.07	3.71	**
Availability ICPEV	5.3	5.0	**
Availability PEV	3.7	3.0	**
Independence PEV	4.3	3.5	**
Freedom PEV	4.1	3.4	**
Autonomy PEV	4.4	3.5	**
Gender (share of women)	44.9%	57.2%	**
Employment status (share)	59.6 %	50.8	*
Possession of a driver's license	94.0%	83.7%	**
Car availability (share)	86.3%	79.6%	*

Significance level: *p < .05; **p < .01; Tests employed: t-tests and chi-square tests

2.2 Factors predicting interest

As a next step we tried to identify predictors of PEV interest. To find these factors we employed logistic regression in a manual step–wise model selection approach commencing with all variables covering attitudinal and socio-economic factors enquired in the questionnaire (cf. Section 2.2). We use the binary variable "Interest in PEV" as dependent variable. Interpreting the coefficients of the final equation from the logistic regression (see table 3) we find that technology affinity, the possession of a driver's license, a high WTPM, and the utilization of public long distance transport predict interest in PEVs. Furthermore, people who approve of the statement "An ICPEV takes me everywhere" are less likely to be interested in PEVs. All together these six factors explain about a quarter of the observed variance (Cox & Snell R-Squared: 0.226 and Nagelkerke's R-Squared 0.302).

Table 4. Variables comprising a significant impact on interest in PEV

	Coefficient	Standard error	Wald statistic	Exp(B)
Utilization of public long distance transport	0.475*	0.186	6.5	0.622
Possession of driver‘s license	1.464***	0.277	27.9	0.231
Technology affinity	0.744***	0.093	68.9	0.461
Willingness to pay more (WTPM)	0.065***	0.010	41.3	0.937
„An ICPEV takes me anywhere“	-0.298***	0.083	13.0	1.347
„With an PEV I can determine my route by myself“	0.352***	0.051	47.1	0.704
Constant	-5.0***	0.597	68.9	141.7

Significance level: * p < .05; ** p < .01; *** p < .001;

Even though all socio-economic variables were analysed as well, none of them was found to have a significant impact on interest in PEVs. The variables used for the logistic regression included only one variable covering the environmental issue (climate protection as the driving principle when choosing an PEV-tariff) but was not significant in predicting PEV-interest.

2.3 Cluster analysis of the majority

As the Majority is quite a large group and includes a high share of consumers we further analyse this group by applying cluster analysis in order to identify sub-groups. In order to reach this goal we utilized the standard k-means algorithm with four clusters. Initially the size of the (Majority) group who had declared to be interested in PEVs consisted of 468 individuals. Out of these 468 individuals 343 persons had completed all variables used in the clustering process. All variables which comprised a significant impact on interest in PEV from the regression analysis, all available socio-economic variables and two more variables which were the only ones which featured environmental interest were used within the clustering process (all in all 16 variables). They are marked in the appendix with a “C”. From the sixteen variables seven proved to significantly explain variance ($p < .05$) within the four clusters: Age, education, employment status, WTPM, household size, car availability in household and frequency of car use.

We coin the first identified group “Cost conscious families”. It consists of about 35% of participants with interest in PEVs. Representatives from this group live

with their family, they are on average 40 years old and are (self-) employed. They use their car on a daily basis and are only willing to pay a small premium for PEVs (< 2%).

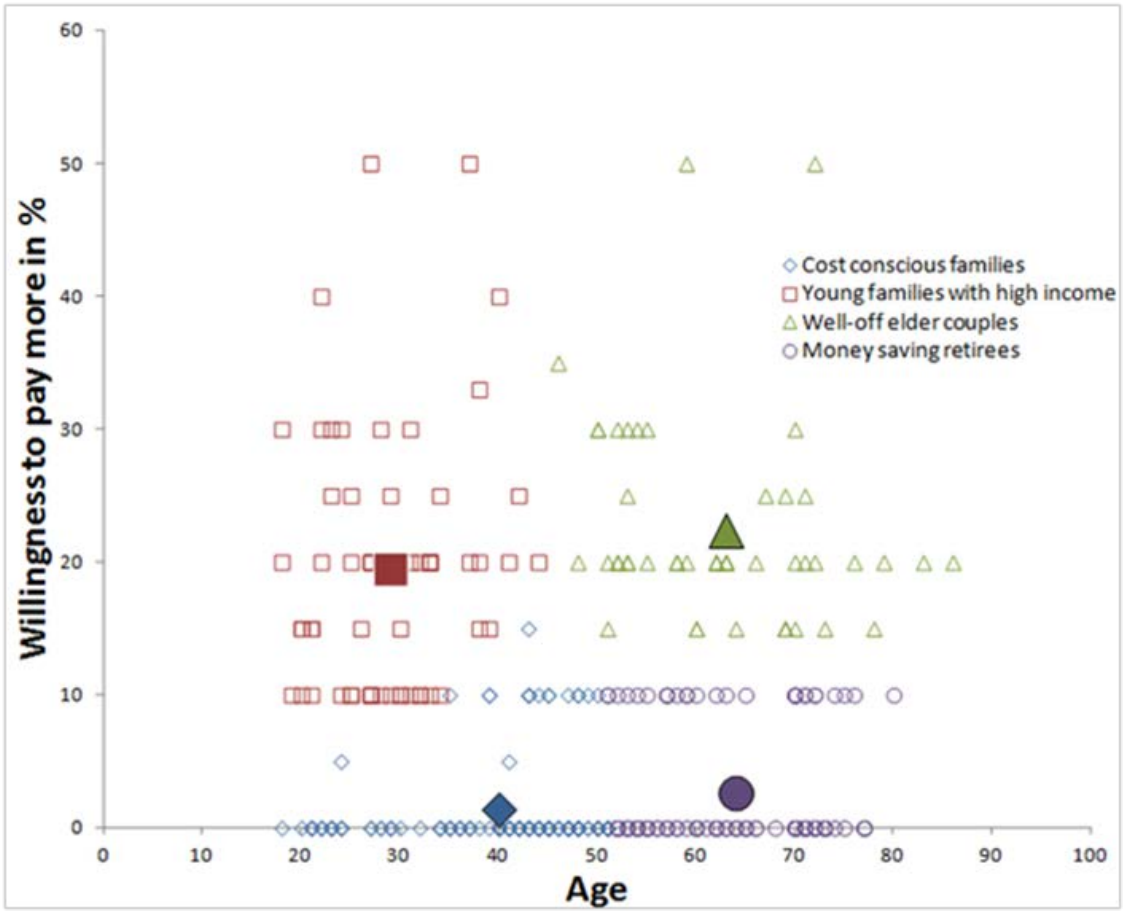

Figure 1: K-means clustering of 343 representatives of the “Majority” group; depiction in regard to WTPM (in %) and age; the enlarged pictograms indicate the cluster centres.

The second group is called “Young families with high income” and includes 18 % of the analysed participants. Members of this group also live in a small family setting (with an average of three persons per household), but they are on average about 11 years younger than the member of the “Cost conscious families” (29 years). They are willing to pay a higher premium of about 19% for an PEV (WTPM). The average group member is (self-) employed and uses his or her car very every day.

14% of all participants interested in PEVs fall into the third group. This group is called “Well-off elder couples” and is characterised by a relatively high additional willingness to pay for PEVs (22%) and an average age of 63 years.

Participants from this group typically live together with their partners. They still work, are likely to keep on earning money but use their car less frequent than members from group one and two.

The fourth group contains 33% of the overall group and is called “Money-saving retirees”. They represent the oldest group (average age of 64 year). If they have children, these seem to have left by now, thus letting the parents live by themselves again. “Money-saving retirees” share a similar additional willingness to pay for PEVs as the “Cost conscious families” which reaches only an average of 3%. They seem to use their car frequently but not as often as members of group one and two.

As mentioned above seven of the 16 employed variables proved to significantly explain variance within the clustering process. Among these seven variables, age and willingness to pay more explained most variance. All groups together with group averages of these two variables are displayed in Figure 1.

Table 5: Results of the k-means clustering according to each of the four clusters

	Clusters			
	Cost conscious families	Young families with decent income	Well-off elder couples	Money saving retirees
Size	119	62	48	114
Size in %	35%	18%	14%	33%
Age mean (SE)	40 (0.85)	29 (0.81)	63 (1.41)	64 (0.74)
Education	4	4	4	4
(Self-) Employment (1=yes/0=no)	1	1	1	2
Willingness to pay more in % mean (SE)	1,4 (M), 0.32 (SE)	19,5 (M), 1.21(SE)	22,4 (M) 1.11(SE)	2,6 (M) 0.41(SE)
Number of people in household	3	3	2	2
Frequency of car use (1=daily, 2= 1-3 times a week)	1	1	2	2
Car availability in household	1	1	1	1

3 Discussion and Conclusion

The present study aimed at answering three research questions as outlined in the introduction. Results will now be discussed in relation to these three questions.

We find that the Majority group, defined by the participants who are interested in PEVs but do not own or plan to own an PEV so far, can be characterized similar to Early Adopter. However we saw that the average characteristics are less pronounced than those of the Innovators and Early Adopter group. Comparing socio-economic and attitude variables between the Majority and the Laggard group suggest that the Majority group is significantly higher educated, more technology affine, consists of more men and its representatives are more often working than the Laggard representatives. Furthermore members of the Majority adopter group feature a significantly higher willingness to pay more for an PEV and have more often a car available at their homes. Concerning their attitudes in regard to PEVs or ICPEVs the data suggests that members of the Majority perceive the availability, the independence, freedom and autonomy related to PEVs significantly higher than the members of the Laggard group. In addition to that they also assess the general availability of ICPEVs as being higher in comparison to the members of the Laggards representatives. This points out that they are possibly more focused on car use in their daily mobility than Laggards.

The results on the socio-economic characteristics blend in well with the results proposed by Plötz et al. (2014). Using their propositions concerning the Early Adopter as a starting point, our results show that the Majority may be characterized as a hybrid between the Early Adopters and the Laggard group. However, this also implies, that this group cannot be characterized very specifically.

From the binary logistic regression we learn that six of the tested variables significantly predict interest in electric vehicles: technology affinity, the possession of a drivers' license, a high WTPM, and the utilization of public long distance transport. On the other side the data tells us that people who approve of the statement „An internal combustion engine vehicle takes me everywhere" are less likely to be interested in PEVs. To foster diffusion of PEVs, the main focus group for PEVs in the next years are very likely to be car drivers with higher than average technology interest who are able to cope with the disadvantages of the PEV (by taking the train and paying more). Therefore it is

advisable that their marketing campaigns continue to emphasize the novelty value of the advertised product. We further recommend to increase efforts to work on technical solutions to reduce the customers range anxiety, as the freedom that car drivers attribute to ICPEVs is not yet developed to same degree ascribed to PEVs. Only later, when customer groups are about to shift towards initially less interested customer groups it seems to be advisable to shift the core of marketing strategies towards the suitability for daily use including more affordable prices.

The aim of conducting a k-means clustering analysis to the Majority group was to analyse subsets of this large group. However, the k-means clustering is an explorative approach to analyse data since the number of clusters is fixed a priori. In order to choose the best number of clusters, we analysed the solutions from two, three and five cluster groups and found that the presented version offers more insight and is easier interpretable. Rescaling all variables to zero mean and unit standard deviation did not qualitatively alter the clusters. As seen above the two biggest clusters (total of 67%) represent a big share of the Majority that are generally interested in PEVs but only willing to pay a small or no premium for PEVs. This matches very well with the overall picture of relatively low willingness to pay more in general.

Axsen et al. (2015) suggested a subdivision of his “Potential early mainstream buyers” group into two sub groups: “Pro environmental” and “Non-environmental”. As the survey used here did not contain environmental-lifestyle oriented variables we can neither reject nor confirm this part of the study by Axsen et al. (2015). However, our division of those interested in PEVs seems similar to the “potential early mainstream” of Axsen et al. (2015).

Several limitations apply to our analysis. First, following Peters and co-workers (cf. Peters & Dütschke, 2014; Peters, Agosti, Popp & Ryf, 2011), we use interest and purchase intention to define the adopter groups. However, other socio-economic variables and other definitions for the Rogers Group could yield additional insight. Second, as in every self stated survey the results of our analysis are likely to be influenced by social desirability and the real behaviour may differ from the stated. This is especially true for future behavioural intentions as they are assumed in this kind of adoption study. Third, we chose four clusters as the outcomes where best interpretable; however, other numbers of clusters may have offered other insights as well and the optimal number of clusters could be analysed in future studies, e.g. by maximising the Bayesian Information Criterion or the gap statistics. Fourth, the variables used for the

clustering included only one variable covering environmental issues (Climate protection as the driving principle when choosing an PEV-tariff) which did not have significant impact. Nonetheless from the finding from Axsen et al. (2015) environmental issues can play role when grouping future customers. Thus, it is likely, that a different measurement of environmental attitudes could have led to different results.

Mass market adoption of PEVs requires large groups of consumers to seriously consider purchasing an PEV. Here we analysed the next large group of potential buyers as those interested in PEVs and factors predicting interest. Our results show that technological affinity and no or low association of freedom with conventional vehicles are main factors in predicting PEV interest. Accordingly, automakers and policy makers should highlight the technological advancement in order to accelerate market diffusion of PEVs.

Following Rogers (2003) and Axsen et al. (2015), the next big groups of are PEV buyers are likely to be dividable into subgroups. Our findings suggest a division by age and willingness to pay a price premium for this new technology. In particular the latter is in line with Rogers (2003) and has not been analysed by Axsen (2015). According to our cluster results the early Majority would amount to a size of 15% of the overall population (0.48 * (0.18 + 0.14) = 0.15); the late Majority in contrast would represent about 32% of the overall population (0.48 * (0.35 + 0.33) = 0.33). Additionally, potential PEV car buyers can by expected in all age groups, yet the biggest group of car buyers is probably to be found in the elder group, due to higher affluence in this group. In conclusion, car and policy makers can expect higher willingness to pay for a few more years but it should decline noteworthy when ten or more percent of vehicle sales will be PEVs.

Acknowledgement

The data for this research has been collected within the project titled ‘intelligent Zero Emission Urban System – iZEUS’. iZEUS was supported by the German Federal Ministry for Economic Affairs and Energy under the funding priority ‘IKT für Elektromobilität’ (ICT for electric mobility).

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Appendix

Scaled variables

The characters used in the column “V-USE” display in which part of the analysis the respective variable has been used: A = adopter groups; L = logistic regression; C = cluster analysis

Variables	Labels & Values	V-USE
Age	years	(A, L, C)
Size of household	number of persons in household	(A, L, C)
Willingness to pay more for an PEV (WTPM)	Share in %	(A,L,C)
Technology affinity	Scale - Cronbach's alpha 0.59; outcome between 1(low) up until 6 (high)	(A, L,C)
Education	1 = No school-leaving diploma, 2 = Basic schooling without apprenticeship, 3 = Basic schooling with finished apprenticeship certificate, 4 = Secondary school certificate, 5 = High school diploma, 6 = University diploma	(A,L,C)
Availability ICPEV (“Ein Auto ist immer verfügbar.” -“A car is always available“)	„Does not apply” (1) to „does fully apply“ (6)	(A, L)
Independence ICPEV („Mit einem Auto bin ich nicht von anderen abhängig.“ – „With a car I am not dependent on others“)	„Does not apply” (1) to „does fully apply“ (6)	(A, L)
Freedom ICPEV („Ein Auto bringt mich überall hin.“ - „A car takes me anywhere”)	„Does not apply” (1) to „does fully apply“ (6)	(A, L,C)
Autonomy ICPEV („Mit einem Auto kann ich meine Route selbst bestimmen.“ - „Using a car I can determine my route by myself “)	„Does not apply” (1) to „does fully apply“ (6)	(A, L, C)
Availability PEV („Ein Elektroauto ist immer verfügbar.“ - “An PEV is always available“)	„Does not apply” (1) to „does fully apply“ (6)	(A,L)
Independence PEV („Mit einem Elektroauto bin ich nicht von anderen abhängig“ - „With an PEV I am not dependent on others“)	„Does not apply” (1) to „does fully apply“ (6)	(A,L)
Freedom PEV („Ein Elektroauto bringt mich überall hin, wo ich möchte“ - „An PEV takes me anywhere”)	„Does not apply” (1) to „does fully apply“ (6)	(A,L)
Autonomy PEV („Mit einem Elektroauto kann ich meine Route selbst bestimmen“ - „ With an PEV I can determine my route by myself “)	„Does not apply” (1) up to „does fully apply“ (6)	(A,L)

Categorical variables

The characters used in the column “V-USE” display in which part of the analysis the variable has been used: A = adopter groups; L = logistic regression; C = cluster analysis).

Variables	Labels & Values	V-USE
Gender	share of females	(A, L, C)
(Self-) Employment status	(self-) employed / unemployed	(A, L, C)
Children in household	yes / no	(A,L)
Possession of driver’s license	yes / no	(A,L,C)
Utilization of public long distance transport	yes / no	(L,C)
Car availability in household	yes / no	(A, L, C)
Frequency of car use	daily (1)/1-3 days a week (2)/ 1-3 days per month (3)/ less frequent (4)	(A, C)
Area of residence	rural region (1) / in a suburb (2) / urban but not in the city center (3)/ in the city center (4)	(L,C)
Climate protection as the driving principle when choosing an PEV-tariff	yes / no	(A, L,C)
Full automation as the driving principle when choosing an PEV-tariff	yes / no	(A, L, C)
Compensation as the driving principle when choosing an PEV-tariff	yes / no	(A, L, C)
Easiness to use as the driving principle when choosing an PEV-tariff	yes / no	(A, L, C)
First choice selector when assessing an PEV tariff	climate protection / full automation / compensation / easiness to use (this variable is a merged variable of the former four variables; it was utilized for analyzing the group differences, but was not explicitly cited in table as the data would have been redundant as the results were are already shown by the former four variables)	(A, L,C)

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Karlsruhe, December 2016