sustainability

MDPI

Article

Attitudes Toward Electric Vehicles: The Case of Perugia Using a Fuzzy Set Analysis

Simona Bigerna and Silvia Micheli *

Department of Economics, University of Perugia, Via A. Pascoli 20, 06123 Perugia, Italy; simona.bigerna@unipg.it

* Correspondence: silvia.micheli@unipg.it; Tel.: + 39-07-5585-5208

Received: 25 September 2018; Accepted: 31 October 2018; Published: 1 November 2018

Abstract: Sustainable mobility has received increasing attention in recent years. The transport sector contributes to almost a quarter of Europe's greenhouse gas emissions. The development of electric vehicles (EVs) may help the shift toward sustainable mobility, reducing oil vulnerability and greenhouse gas emissions in road transport. Poor penetration of EVs might be explained, moreover, by consumer resistance to EVs. The aim of our paper is to determine consumers' attitude and preferences for EVs, investigating which conditions influence consumer decision-making to purchase an EV. Using a fuzzy set qualitative comparative analysis of 421 highly-educated individuals, involving students and faculty members, we identify several configurations of conditions of the variables which lead to the outcomes, supporting their equifinality and asymmetric nature. Our findings indicate attitudes related to EVs differ across age and groups. Our paper offers public decision makers new useful insights for understanding the importance of specific determinants, and for designing effective strategies for EVs' development worldwide.

Keywords: electric vehicles; sustainable mobility; consumer attitude; fuzzy set qualitative comparative analysis

1. Introduction

As our planet faces the costs of climate change, actions are needed to adapt to a more sustainable development model. The European Union (EU), a global leader on climate action, is developing measures aimed at increasing investments in green technologies [1]. Green technologies describe those technologies that attempt to protect the natural environment by reducing pollution and by conserving energy and resources [2].

The European Council has proposed new annually binding national greenhouse gas (GHG) emission reductions targets by member countries from 2021 to 2030 to reach the EU target of reducing its GHG by 30% below 2005 levels in 2030 in the sectors of energy, transport, industrial processes and product use, agriculture and waste. Focusing on the transport sector, the EU considers the development of alternative fuels to face the scarcity of conventional fossil fuels, their increasing costs, and growing GHG emissions. The transport sector currently represents almost a quarter of the EU's GHG emissions [3].

Sustainable mobility requires action to strengthen the links between land use and transport, to reduce the need to travel, to encourage modal shift, and to encourage greater efficiency in the transport system [4].

In this context, the deployment of electric vehicles (EVs; in this paper, electric vehicles include battery electric vehicles (BEVs), hybrid electric vehicles (HEVs), and plug-in electric vehicles (PHEVs)), as part of the shift toward sustainable mobility, enables the reduction of GHG emissions in road transport and oil vulnerability [5,6]. EVs are considered a crucial component of the future transport

system, due to their high efficiency throughout the fuel supply chain and vehicle fuel consumption [7,8]. A number of positive impacts can be expected from the development of EVs. They are an alternative approach to contribute to a more sustainable mobility, reducing fuel consumption and GHG emissions [9]. EVs are the best way to tap into renewable energy sources, such as solar and wind power [10], thus indicating that the deployment of EVs and renewable energy sources should take place concomitantly [11]. Moreover, EVs have the potential to make major contributions to the electric supply system, as storage or generation resources, or both [12]. Specifically, EVs can absorb excess energy production (for instance from wind power) that would be wasted or curtailed [13].

However, the emerging EV "industry" still faces technological challenges in terms of vehicle and infrastructure design, and EVs are expensive to obtain. There are unresolved issues about the viability of the current generation of EVs, such as rapid charging, range, lack of infrastructure, and load of the grid. Also, off peak-load impacts may arise from the integration of EVs with electricity grids [14].

Despite the fact that the Paris Declaration on Electro-Mobility and Climate Change and Call to Action has forecast a threshold of 100 million EVs by 2030 [15], it has to be recognized that large scale EV deployment is still not a reality. There were 2 million EVs in circulation worldwide in 2016, i.e., 1.4% of the total passenger car market.

Transitions to green technologies such as EVs often require significant shifts not only in technology, but in political regulations, tariffs and pricing regimes, and the behavior of users and adopters [16]. Consumer resistance to EVs is an obstacle to the adoption of this technology. Potential EV purchasers identify the cost premium, range limitation and recharging time of EVs as disadvantages compared to conventional vehicles. We focus our analysis on the behavior of young adults, i.e., university students, who are less traditional and skeptical toward new technologies compared to adults, as has occurred, among other things, with mobile phone use [17]. Young adults represent an important group of EV early adopters in the long run. In spite of the recent trends of car sharing, the cultural preference for private property rather than collective ownership and use stimulates the individual ownership of cars and works against car-sharing schemes [18].

The aim of our paper is to determine consumers' attitude and preferences for EVs, investigating which conditions influence consumer decision-making to purchase an EV. In our study, we focus on university students and faculty members—both are considered better educated and are more likely to be early adopters of EVs. However, they differ socio-economically—such as in terms of income and employment status. Comparing the two groups may help reveal the similarities or differences of the decision process for EVs, which is poised to be the dominant propulsion technology in the future.

Based on a survey of 421 students and faculty members of the University of Perugia, one of the largest university cities in Italy, we employ fuzzy set qualitative comparative analysis (fsQCA) that is of both quantitative and qualitative in nature [19,20]. The fsQCA represents a useful approach that include the advantages of both qualitative and quantitative analyses, because it allows interaction effects among each characteristic within a case, and it allows flexibility in the characterization of cases. The number of researchers who use this methodology in the field of consumer preferences, and specifically in the field of EVs, is steadily increasing [21].

In particular, we focus on the analyses of social, environmental and technological factors, such as benefits and barriers perceived by consumers, which might be a useful tool both to develop the EV market share among consumers, and to support policy makers in designing effective strategies pushing EVs. The novelty of our paper is that it identifies, for different age groups, configurations of conditions that would exert an important positive influence when considering EVs and potential purchase decisions, providing useful insights for understanding specific pattern of variables for EVs' deployment in Perugia and elsewhere.

The paper proceeds as follows. Section 2 presents the literature review. Section 3 describes the data source and methodology. Section 4 presents the results. Section 5 contains discussion and conclusions.

2. Literature Review

There is a stream of research about consumer preferences of EVs [22–28]. Vehicle price, fuel cost, driving range, battery replacement cost, charging time and maintenance cost are among the important attributes used in consumer choice modelling [29]. Range anxiety, refueling availability, and vehicle efficiency influence EVs' adoption. Due to the uncertainty of the fuel economy, drivers of EVs, and specifically BEVs, may not feel comfortable fully depleting their batteries [30]. Consumer adoption of energy-efficient technology might be strongly influenced by the type of tax incentive offered, with particular reference to sales tax exemption, meaning that lower price at the time of purchase is a central attribute to spur consumer adoption of EVs [31]. EU member countries with a higher uptake of EVs are those where fiscal incentives are implemented [32]. Consumer resistance to EVs might be related to the lack of understanding of the benefits of EVs, such as future fuel savings and lifetime operating costs. Therefore, policy makers and manufacturers should aim at consumer education to enhance knowledge and spur EV purchase decisions [33].

Ozaki and Sevastyanova [34] found that attitudes and conforming toward social norms influenced the purchase decision with respect to EVs. According to Beck et al. [35], environmental attitudes in the choice of EVs could be used to segment individuals and aid in the development of policy. The results of Mau et al. [36] support the relevance of a range of vehicle attributes beyond the purchase price in shaping consumer preferences toward EVs. Wolbertus et al. [37] showed that offering free parking has a positive effect on the purchase intention of EVs. Many drivers were concerned about the financial implications of purchasing. Indeed, compared with conventional cars, EVs have a high purchase price, even if EVs have low per-kilometer running costs.

However, subjective norm, that is the perceived social pressure, and perceived behavioral control, significantly affect EV adoption. The empirical results of Wang et al. [38] showed that the attitude toward HEVs, subjective norm, perceived behavioral control (the three primary elements of the TPB (Theory of Planned Behavior) model) and personal moral norm partially mediate the effect of consumers' environmental concerns about their intention to adopt HEVs. Ziegler [39] noted that environmentally aware potential car buyers have a higher stated preference for EVs. Nayum et al. [40] showed that EV buyers had a significantly different socio-psychological profile from any group of conventional car buyers. Jansson et al. [41] showed the importance of interpersonal influence, on eco-innovation adoption. A consumer's propensity to buy an EV increases with youth, education and green life style [42]. People between their mid-twenties and mid-sixties are more willing to buy EVs because, in the case of those in their mid-twenties, they are young enough to show a high level of environmental value and, in the case of those in their mid-sixties, they are old enough to have a medium-high level of income [43,44]. Smith et al. [45] found that EV adopters are more likely to be younger, more educated and male, although the fact these are not statistically significant suggests that socio-demographics in themselves may not be a key explanatory variable

Table 1 shows the authors (and the year of publication), country investigated, and key findings of the reviewed studies.

Table 1. Overview of factors influencing consumers electric vehicle (EV) adoption.

References	Authors (Year)	Country Investigated	Key Findings
[46]	Lane and Potter (2007)	United Kingdom	Poor knowledge of cleaner car technologies
[47]	Bjerkan et al. (2016)	Norway	High purchase costs
[48]	Barth et al. (2016)	Germany	Purchasing cost, driving range, charging time
[49]	Beck et al. (2017)	Australia	Driving range, government incentives, climate change
[50]	Dumortier et al. (2015)	United States	Battery cost, driving range
[51]	Bühler et al. (2014)	Germany	Low noise, purchasing cost, driving range
[52]	Adepetu and Keshav (2015)	United States	Driving range, battery capacity, purchasing cost
[53]	Hoen and Koetse (2014)	The Netherlands	Fuel cost, total cost, financial benefit
[54]	Franke and Krems (2013)	Germany	Charging infrastructure, exemption of road tax
[55]	Higgins et al. (2017)	Canada	Age, education, fuel economy
[56]	Shahraki et al. (2018)	China	Charging infrastructure
[57]	Tal et al. (2014)	California	Driving range
[58]	Xydas et al. (2016)	United Kingdom	Charging infrastructure

Table 1. *Cont.*

References	Authors (Year)	Country Investigated	Key Findings
[59]	Plötz et al. (2017)	Germany and United States	Driving range
[60]	Nicholas and Tal (2017)	United States	Charging infrastructure
[61]	Morrissey et al. (2016)	Ireland	Charging infrastructure
[62]	Caperello et al. (2015)	United States	Charging infrastructure
[63]	Langbroek et al. (2017)	Sweden	Environmental sustainability
[64]	Wang et al. (2017)	China	Financial incentive policy measures
[65]	Moon et al. (2018)	Korea	Charging time and purchase costs
[66]	Ferguson et al. (2018)	Canada	Maintenance costs

In summary, our paper contributes to the literature by providing an understanding of the role played by specific configurations of conditions as a strategic element for EV acceptance among consumers.

3. Data Source and Methodology

3.1. Data Collection Process

In Italy, about 2600 BEVs and 4800 PHEV were sold in 2017, out of 2 million cars in total. The average number of kilometres travelled by Italian vehicles is approximately 14,000 km/year. According to Franzò et al. [67], the overall CO_2 emissions, per year, is higher than 50 million tons, which represents approximately 20% of the overall yearly CO_2 emission in Italy. Thus, the deployment of EVs in Italy represents an essential part of the plan to cut oil vulnerability in coming years. The current government has announced its intention to grow the country's EV market by putting one million new EVs on the nation's roads by 2022. There are several initiatives supporting the introduction of EVs in Italy: legislation, regulations, standards, promotions, and demonstrations. Most of these initiatives come from electric utilities interested in analyzing the potential impact of EVs on the electricity grid.

The rate of diffusion of EVs in Italy is very low and its impact on the total automotive market is really small. In December 2017, the share of BEVs and hybrids (HEVs plus PHEVs) were around 0.15% and 3.78% of the total, respectively. Several barriers hinder the diffusion of EVs in Italy, like the EV purchase price, and range anxiety. Despite the fact that the rate of diffusion of EVs is currently very low, our study aims to investigate consumers' preferences for EVs in order to highlight some patterns for EVs deployment.

Our study has been conducted in Umbria (Italy is subdivided into 20 Regions, of which eight are in northern Italy (Aosta Valley, Piedmont, Liguria, Lombardy, Emilia-Romagna, Veneto, Friuli-Venezia Giulia, Trentino Alto-Adige); four are in central Italy (Lazio, Marche, Tuscany and Umbria); six are in southern Italy (Abruzzo, Apulia, Basilicata, Calabria, Campania and Molise); and two are insular Italy (Sardinia and Sicily), all of which have different characteristics.) Umbria is a region of central Italy, also known as the country's 'green heart', and characterized by medieval hill towns. Umbria ranks in 17° place among the 20 regions by demographic size (888,908 inhabitants in 2017). Perugia, situated on a hill, is the regional capital; it is an Italian medium-sized city with around 167,000 inhabitants. Perugia is known as a university town, with the University of Perugia founded in 1308 (about 34,000 students), and the University for Foreigners (5000 students). The University of Perugia is representative of Italian and European universities, given the highly globalised education system in Europe (see for instance the Bologna reforms that help to increase compatibility between education systems to makes it easier for students to move within Europe) [68].

A web-based questionnaire has been developed to collect data from a university sample of 450 individuals, from February to June 2015, in Perugia. The sample consisting of two groups, students and faculty members, and medium to high education-level individuals, allows us: (i) to detect the role of respondents age in determining the preferences toward EVs for their implementation in a successful way; and (ii) to take into account an important consumer segment with strong potential and opportunity for innovations, such as EVs. We received 421 valid responses (questionnaires are

available from the authors upon request) involving 316 students and 105 faculty members of the University of Perugia. The questionnaire was pre-tested through face-to-face interviews with a group of 30 students [69], and it was prepared by taking into account complex criteria from the related literature, such as costs, benefits, performance, appeal, status [70–72].

For the students, the sample comprises of 45% female, 90% come from the area of Perugia, the average annual household income ranges between €20,001 and €30,000. For the faculty, the sample comprises of 39% female, the average annual household income of the whole faculty members sample is higher than €40,001.

As a daily transport routine, both students and faculty use private vehicles, driving on average less than 30 km daily, or buses. The sample for this study is a combination of students and faculty members, residing in Perugia and residing in other parts of Italy, travelling in Perugia to study and to work, respectively; so, with specific reference to the car and bus user groups, the sample for our analysis adequately represents the region's population.

3.2. Data Analysis Method

The aim of this research is to find causal patterns that explain the consumers' attitude toward EVs. Consequently, the fsQCA approach, which is able to find joint conditions that can explain a selected outcome, is used [73].

This approach shows how causal conditions are linked to an outcome of interest [19,20,74]. In this way, each individual observation is regarded as a whole, as opposed to traditional correlation research that identifies net effects of independent variables on a given dependent variable [75]. According to the fsQCA approach, in the social reality the effect of one variable depends on the presence or absence of another, thus treating cases holistically [76]. The fsQCA allows for an exploration of equifinality, that is, different combinations of conditions may lead to the same outcome [77]. Thus, fsQCA brings out the multiplicity of causal paths underlying management phenomena [78]. This is particularly relevant to the context of purchasing vehicles since consumers differ in the aspects that trigger their behavior.

Depending on the way the conditions are combined, they can generate different outcomes. Therefore, it is necessary to set membership to understand the relationship between multiple conditions. In particular, variables are calibrated into set membership values where 1 indicates full membership and 0 indicates full non-membership. Both partial membership scores and a crossover point of maximum ambiguity (0.5) exist [79].

The fsQCA calls for the construction of the truth table which computes the consistency and coverage of the solutions obtained. The consistency, ranging from 0 to 1, indicates whether the membership score on the outcome is consistently higher than the membership score of the causal combination. The coverage informs the researcher about the degree to which a cause or causal combination accounts for instances of an outcome [20,80]. Following [81], we transform the variables to fuzzy scores ranging from 0.0 to 1.0 using fsQCA software.

The fsQCA analysis uncovers which causal conditions are necessary, and which are sufficient, thus it is especially suitable to analyze complex configurational patterns, equifinality, and multiple optimal conditions in small sample designs [82].

The short form used in this study consists of a five-point Likert-type scale. The descriptive statistics of the variables obtained from answers given to some specific questions in the questionnaire are as follows: we explore two outcomes of interest, the first one is "interest toward EVs", and the second one is "intention to purchase EVs".

We have preliminarily tested whether there are statistically significant differences in the responses of students and faculty members about interest toward EVs and intention to purchase EVs. We have applied the Pearsons's chi square test, assuming as the maintained hypothesis H0 the multinomial distribution of students to test the difference with respect to the faculty members. The test value for the variable interest is 17.2 and for the variable intention is 24.9. In both cases, we can conclude that there are significant differences in the responses of the two sub-groups, which motivates further the

analysis of different age within the sample of highly-educated people, representing the category of early adopters for a new technology, such as EVs.

To measure the outcomes, we use the following variables: *frequent car use*, with a score of one denoting no use, and score of five denoting the most frequent use. The same five-point Likert-type scale has been used for the other variables: *bus users*, defining the frequency of usage; *climate awareness*, as the perception of contribution of EVs to climate change mitigation; *fuel economy*, as the perception of differential efficiency of EVs in fuel usage; *people's opinions*, as the importance of how much individuals are concerned with what others think of them. Specifically, this variable captures the perceived opinions of "important others", which refers to the people who are highly concerned that others will approve or disapprove of them. This process is probably based on a need for social approval and acceptance [83]. The other variables are: *range*, as the relevance of the limitation of the distance EVs can travel before needing a recharge; this can be interpreted as range anxiety, i.e., the fear of fully depleting a battery in the middle of a trip. The last two variables are numerical: *average daily km*, distances travelled per day; *reservation price*, the price of gasoline (€/liter) above which consumers would consider switching to EVs. Specifically, we ask the maximum refueling "acceptable" amount of money (€/liter) they would be willing to pay for continuing to use conventional vehicles.

4. Analysis Results

The descriptive statistics are presented in Table 2. The variables have been calibrated according to our conceptualization, using the standard threshold for full membership, full non-membership, and the cross-over point.

Table 2. Descriptive statistics.

Students				
	Mean	**S.D.**	**Minimum**	**Maximum**
Frequent car use	0.74	0.32	0.05	0.95
Average daily Km	0.34	0.31	0.05	0.95
Climate awareness	0.78	0.23	0.05	0.95
Fuel economy	0.84	0.21	0.05	0.95
Range	0.29	0.30	0.03	1.00
Reservation price	0.53	0.41	0.05	0.95
Faculty Members				
	Mean	**S.D.**	**Minimum**	**Maximum**
Frequent car use	0.81	0.28	0.05	0.95
Average daily Km	0.39	0.36	0.03	0.95
Climate awareness	0.84	0.23	0.05	0.95
Fuel economy	0.83	0.20	0.05	0.95
Range	0.64	0.36	0.00	1.00
Reservation price	0.36	0.34	0.01	1.00

It is interesting to note that, in general, the mean values for the faculty members are higher than those of the students for all variables reported, with the exception of the reservation price.

We tested the necessary conditions relative to the outcome "interest toward EVs" for both students and faculty members. We skipped the same test for the outcome "intention to purchase EVs" because we assume that the necessary conditions for the outcome "interest toward EVs" are the prerequisite for the second outcome to occur. Necessary conditions are fulfilled if the consistency score is over the threshold value of 0.90 [82].

Table 3 shows that three conditions can be considered necessary because the function's consistency score is above the required threshold for all the sample: *frequent car use*, *climate awareness*, and *fuel economy*.

Therefore, we examined sufficient conditions to obtain causal configurations, establishing a threshold value of 0.80 to permit at least one case in the sample to be empirically relevant (Table 4).

It turns out that intermediate solutions are informative because consistency values are equal to 0.76 and 0.80, and overall coverage values indicates that causal conditions account for 81% and 71% of membership in the solutions for students and faculty members, respectively.

Table 3. Overview of necessary conditions.

Interest toward EVs				
Conditions	**Students**		**Faculty Members**	
	Consistency	**Coverage**	**Consistency**	**Coverage**
Frequent car use	0.90	0.70	0.96	0.67
Average daily Km	0.44	0.80	0.48	0.73
Climate awareness	0.91	0.72	0.96	0.68
Fuel economy	0.92	0.68	0.94	0.68
Range	0.38	0.82	0.71	0.66
Reservation price	0.61	0.70	0.43	0.67

Table 4. Results of the intermediate solutions for the outcome "interest toward EVs".

	Students			**Faculty Members**	
Configurations	**Intermediate Solution**			**Intermediate Solution**	
	1	2	3	1	2
Frequent car use	●		●	●	●
Average daily Km					
Climate awareness	●	●	●	●	●
Fuel economy	●	●	●		
Range				●	
Reservation price		●	●		
Raw coverage	0.68	0.40	0.32	0.52	0.41
Unique coverage	0.05	0.02	0.02	0.11	0.10
Consistency	0.80	0.82	0.87	0.82	0.88
Overall solution coverage	0.81			0.71	
Overall solution consistency	0.76			0.80	

Black circle "●" denotes the presence of a condition, while blank space indicates "don't care".

Note that students and faculty members have different configurations leading to the outcome. In the case of students, there exist three configurations for the outcome "interest toward EVs" that comply with the target threshold. Configuration 1 shows that a combination of *frequent car use*, *climate awareness* and *fuel economy* is a sufficient condition for the outcome, with the remaining causal conditions irrelevant for reaching the outcome. Among the solutions, this should be the most important causal path, with a unique coverage of 0.05. Configuration 2 shows that a combination of *climate awareness*, *fuel economy* and *renewable energy prices* is a sufficient condition for the outcome. Configuration 3 shows that a combination of *frequent car use*, *climate awareness*, *fuel economy* and *renewable energy prices* is a sufficient condition for the outcome. Thus, among the solutions, the *fuel economy* variable is shared among all the configurations.

In the case of faculty members, the results indicate the presence of two configurations for the outcome "interest toward EVs". Configuration one, which is the most important expression with a unique coverage of 0.11, combines *frequent car use*, *climate awareness*, and *range*. Configuration two, with a unique coverage of 0.10, includes *frequent car use* and *climate awareness*. Thus, *climate awareness*, which is the variable referring to EVs as instruments, among others, helping to potentially reduce environmental impacts, is shared among all the configurations.

Our analysis also takes into account the outcome "intention to purchase EVs", in order to examine whether differences exist between interest and intention. Results of the fsQCA analysis for sufficient conditions for "intention to purchase EVs" are presented in Table 5. We find different configurations with respect to the previous interest variable.

Table 5. Results of the intermediate solutions for the outcome "intention to purchase EVs".

	Students			**Faculty Members**		
Configurations	**Intermediate Solution**			**Intermediate Solution**		
	1	2	3	1	2	3
Frequent car use	●	●		●	●	●
Average daily Km						●
Bus users	●	●	●	●	●	●
Climate awareness	●	●	●	●		
Fuel economy						
Range		●	●		●	●
Reservation price	●		●			●
People's opinion				●	●	●
Raw coverage	0.41	0.18	0.10	0.42	0.33	0.09
Unique coverage	0.11	0.01	0.01	0.16	0.09	0.01
Consistency	0.80	0.88	0.87	0.80	0.83	0.88
Overall solution coverage	0.82			0.66		
Overall solution consistency	0.77			0.76		

Black circle "●" denotes the presence of a condition, while blank space indicates "don't care".

The results indicate overall solutions consistency of 0.77 and 0.76, and overall solutions coverage of 0.82 and 0.66 for students and faculty members, respectively, suggesting that quite a good proportion of the outcome is covered by the solutions. The outcomes of the analysis for "intention to purchase EVs" yield three different configurations.

Specifically, for the students, configuration one shows that a combination of *bus users*, *frequent car use*, *climate awareness* and *reservation price* leads to a positive intention to purchase EVs. Thus, they are quite similar in their current travel behavior, attitudes and potential to adopt EVs.

In addition, for faculty members, in configuration one the outcome is determined by a combination of *frequent car use*, *bus users*, *climate awareness*, and *people's opinion*. The variables *frequent car use*, *bus users* and *people's opinion* occur along the three configurations. Configuration two includes also *range*, while configuration three includes *reservation price* and *range*.

Given that the average annual household income for students and faculty members is quite similar, no relevant differences emerge between the two groups in relation to income and EV preferences.

Our findings should not be interpreted as market predictions, but rather as an explorative approach to investigate the preferences to adopt a certain mode of transport.

In line with most of the literature on the fsQCA technique [84], we conducted robustness checks of our results. Among the different ways to assess the robustness of the results, we performed the fsQCA technique by imposing more restrictive minimum thresholds for the outcome and conditions [85]. This replication yielded the same sufficient configurations as did our original analysis, attesting that the results are relatively robust.

All the configurations for students and faculty members are jointly sufficient conditions for the outcomes "interest toward EVs" and "intention to purchase EVs" because we get very high PRI (Proportional reduction in consistency), exceeding 0.6 threshold [86], and very low PRI values for the absence of the outcomes.

5. Conclusions and Policy Implications

This paper is a comprehensive examination of consumers' attitudes and preferences for EVs, investigating which conditions influence consumer decision-making to purchase an EV, with particular reference to two groups of consumers, i.e., students and faculty members of the University of Perugia, Italy. Our findings might give insights to policy makers to design effective strategies pushing EVs among consumers. We employ fsQCA in order to highlight the complexity of the conditions which influence two outcomes, "interest toward EVs", and "intention to purchase EVs".

Most of the literature in this field investigates a single path for consumer adoption of EVs [87–89]. However, consistent with the idea of complementarities, we assume that the outcomes are related to a number of sufficient combinations of conditions. Multiple causal paths are detected by using the fsQCA technique.

In the first part of our analysis, we analyze the configurations that lead to the outcome "interest toward EVs". Three different configurations exist that lead to "interest toward EV" for students and two configurations for faculty members, providing evidence that there exist complex interactions between values and consumers' behavioral heterogeneity.

In the case of students, the most interesting configuration is represented by the combination of variables *climate awareness* and *fuel economy*. There is some empirical evidence of the interests' motivation toward EVs, which shows they are seen as a response to environmental concerns. *Fuel economy* is a controversial value. The presence of such a variable in our configurations may come from a detailed economic analysis of respondents, or from a sudden reaction to the volatility of fuel prices. After the temporary consumption reduction due to the oil shocks of the 1970s, consumers returned to the previous high consumption levels when oil prices declined in the 1980s, suggesting that consumers had not changed their attitudes in the long run [90]. However, after the higher oil prices in 2008, many people switched permanently to more efficient vehicles, suggesting that consumers may have incorporated more complex values, such as ethics and environment, in their long-run choices. We highlight the fact that fuel economy, being a common determinant of all three configurations for the sub-group analyzed (students), points out that the new generation possesses a high awareness of the importance of the climate change issue in everyday life.

In the case of faculty members, it turns out that the variables *frequent car use* combined with *climate awareness* and *range* exert a positive influence on consumers "interest toward EVs". The *range* variable arises only in the case of faculty members. Range anxiety is not closely linked to miles to go, but rather to the habit of using traditional vehicles which can be refueled without problems, if necessary. This finding suggests the importance of the public charging infrastructure issue, which appears to be capable of increasing interest toward EVs.

The entire sample behavior is equally influenced by *climate awareness*, meaning that environmental awareness is homogeneously diffused in society. Our findings are in contrast with some previous studies. Our results offer an important contribution for evaluating strategies for EV development, because they suggest that policies for spurring the initial EV deployment should be targeted at the entire population, regarding the consumers' age, in order to increase the awareness of EVs as a tool for greening the transport sector.

In the second part of our analysis, we analyzed the configurations that lead to the outcome "intention to purchase EVs", investigating the motivations behind the purchasing behavior, finding that, for students, intention to purchase EVs is driven by environmental issues. Also *bus users* becomes a relevant variable as a determinant of the intention to purchase EVs. It probably indicates that opportunity cost considerations are important for the choice of switching from a lifestyle which is environmentally conscious, but using public transportation, to a new lifestyle equally environmentally conscious characterized by a new technology. Faculty members are also influenced in their decision to purchase EVs by the variable *people's opinion* in the solutions, highlighting that this group is more open to suggestions taken from the experience of other people.

Our study has some limitations, which suggest some further lines for future research. The respondents represent a specific sample made of medium to highly educated individuals. We interpret this as a proxy for the characteristics of early adopters. More refined analysis can address the specific issue of clustering the characteristics of potential future adopters of EVs, analyzing other socio-demographic groups, and extending the analysis of university students at the EU level given the importance of university-level cultural exchange programs [91]. Also, the analysis is based on respondents stated EV preferences in terms of interest and intention, but a connection may exist between consumer purchase intention and actual behavior which can be explored in further research.

Despite the aforementioned caveats, our study constitutes a first important contribution for evaluating conditions that might trigger the spread of the deployment of EVs in Italy and elsewhere. Broadly, the results of the analysis indicate that students and faculty members' acceptance of EVs is definitively affected by environmental concerns. However, supporting the equifinality and the asymmetric nature of both interest and purchasing intention behaviors, our findings show that there are several causal configurations leading to the outcomes. Consumers attitudes are very important to identify suitable characteristics that influence preferences toward EVs, and the behavior of consumers. Most of the previous studies showed consumer profiles using statistical methods. The most critical issue in developing consumer profiles is how to group several characteristics. Our paper, implementing the fsQCA approach, detects different conjunctions of configurations that all lead to the same outcome. Thus, our paper can give a consumer preference profile that is not only representative but also more informative.

The main policy implications for both private and public decision makers are that: (i) marketing and regulation strategies need not be differentiated according to the consumers' age for early adopters; (ii) EVs are considered favorably by users of public transportation, i.e., those with higher sensibility toward environmental friendly actions, congestion management, and climate change policies.

Author Contributions: The manuscript was written through joint contributions from all authors.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. European Commission. *Horizon 2020—Work Programme 2018–2020*; European Commission Decision C(2018)4708 of 24 July 2018; European Commission: Brussels, Belgium, 2018; Available online: ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-energy_en.pdf (accessed on 19 September 2018).
2. Ottman, J.A.; Stafford, E.R.; Hartman, C.L. Avoiding green marketing myopia. *Environ. Manag. Read. Cases* **2008**, *48*, 296.
3. European Commission. *Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on Binding Annual Greenhouse Gas Emission Reductions by Member States from 2021 to 2030 Contributing to Climate Action to Meet Commitments under the Paris Agreement and Amending Regulation (EU) No 525/2013*; European Commission: Brussels, Belgium, 2018; Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJs.L_.2018.156.01.0026.01.ENG&toc=OJ:L:2018:156:TOC (accessed on 19 September 2018).
4. Banister, D. The sustainable mobility paradigm. *Transp. Policy* **2008**, *15*, 73–80. [CrossRef]
5. Leung, A.; Burke, M.; Cui, J.; Perl, A. Fuel price changes and their impacts on urban transport—A literature review using bibliometric and content analysis techniques, 1972–2017. *Transp. Rev.* **2018**, 1–22. [CrossRef]
6. Mattioli, G.; Wadud, Z.; Lucas, K. Vulnerability to fuel price increases in the UK: A household level analysis. *Transp. Res. Part A Policy Pract.* **2018**, *113*, 227–242. [CrossRef]
7. Baran, R.; Loureiro Legey, L.F. The introduction of electric vehicles in Brazil: Impacts on oil and electricity consumption. *Technol. Forecast. Soc. Chang.* **2013**, *80*, 907–917. [CrossRef]
8. Larcher, D.; Tarascon, J.M. Towards greener and more sustainable batteries for electrical energy storage. *Nat. Chem.* **2015**, *7*, 19. [CrossRef] [PubMed]
9. Keyvanfar, A.; Shafaghat, A.; Muhammad, N.Z.; Ferwati, M.S. Driving behaviour and sustainable mobility—Policies and approaches eevisited. *Sustainability* **2018**, *10*, 1152. [CrossRef]
10. Gilbert, R.; Pearl, A. *Transport Revolutions: Moving People and Freight without Oil*; Routledge: Abingdon, UK, 2012.
11. Albanese, L.; Ciriminna, R.; Meneguzzo, F.; Pagliaro, M. The impact of electric vehicles on the power market. *Energy Sci. Eng.* **2015**, *3*, 300–309. [CrossRef]
12. Kempton, W.; Letendre, S.E. Electric vehicles as a new power source for electric utilities. *Transp. Res. Part D Transp. Environ.* **1997**, *2*, 157–175. [CrossRef]

13. Richardson, D.B. Electric vehicles and the electric grid: A review of modeling approaches, Impacts, and renewable energy integration. *Renew. Sustain. Energy Rev.* **2013**, *19*, 247–254. [CrossRef]
14. Paevere, P.; Higgins, A.; Ren, Z.; Horn, M.; Grozev, G.; McNamara, C. Spatio-temporal modelling of electric vehicle charging demand and impacts on peak household electrical load. *Sustain. Sci.* **2014**, *9*, 61–76. [CrossRef]
15. International Energy Agency. *Global EV Outlook 2016*; OECD/IEA: Paris, France, 2017.
16. Sovacool, B.K. How long will it take? Conceptualizing the temporal dynamics of energy transitions. *Energy Res. Soc. Sci.* **2016**, *13*, 202–215. [CrossRef]
17. Pagani, M. Determinants of adoption of third generation mobile multimedia services. *J. Interact. Mark.* **2004**, *18*, 46–59. [CrossRef]
18. Geels, F.W. A socio-technical analysis of low-carbon transitions: Introducing the multi-level perspective into transport studies. *J. Transp. Geogr.* **2012**, *24*, 471–482. [CrossRef]
19. Ragin, C.C. *Fuzzy-Set Social Science*; University of Chicago Press: Chicago, IL, USA, 2000.
20. Ragin, C.C. *Redesigning Social Inquiry: Fuzzy Sets and Beyond (Vol. 240)*; University of Chicago Press: Chicago, IL, USA, 2008.
21. Yong, T.; Park, C. A qualitative comparative analysis on factors affecting the deployment of electric vehicles. *Energy Procedia* **2017**, *128*, 497–503. [CrossRef]
22. Caulfield, B.; Farrell, S.; McMahon, B. Examining individuals preferences for hybrid electric and alternatively fuelled vehicles. *Transp. Policy* **2010**, *17*, 381–387. [CrossRef]
23. Greene, D.L.; Park, S.; Liu, C. Analyzing the transition to electric drive vehicles in the US. *Futures* **2014**, *58*, 34–52. [CrossRef]
24. Hoen, A.; Koetse, M.J. A choice experiment on alternative fuel vehicle preferences of private car owners in the Netherlands. *Transp. Res. Part A Policy Pract.* **2014**, *61*, 199–215. [CrossRef]
25. Bigerna, S.; Bollino, C.A.; Micheli, S. Italian youngsters' perceptions of alternative fuel vehicles: A fuzzy-set approach. *J. Bus. Res.* **2016**, *69*, 5426–5430. [CrossRef]
26. Ishida, S.; Magnusson, M.; Nagahira, A. Factors influencing Japanese auto suppliers' predictions about the future of new technologies—An exploratory study of electric vehicles. *Futures* **2017**, *89*, 38–59. [CrossRef]
27. Wolinetz, M.; Axsen, J. How policy can build the plug-in electric vehicle market: Insights from the REspondent-based Preference and Constraints (REPAC) model. *Technol. Forecast. Soc. Chang.* **2017**, *117*, 238–250. [CrossRef]
28. Anagnostopoulou, E.; Bothos, E.; Magoutas, B.; Schrammel, J.; Mentzas, G. Persuasive technologies for sustainable mobility: State of the art and emerging trends. *Sustainability* **2018**, *10*, 2128. [CrossRef]
29. Driscoll, A.; Lyons, S.; Mariuzzo, F.; Tol, R.S.J. Simulating demand for electric vehicles using revealed preference data. *Energy Policy* **2013**, *62*, 686–696. [CrossRef]
30. Cui, S.; Zhao, H.; Wen, H.; Zhang, C. Locating multiple size and multiple type of charging station for battery electricity vehicles. *Sustainability* **2018**, *10*, 3267. [CrossRef]
31. Gallagher, K.S.; Muehlegger, E. Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology. *J. Environ. Econ. Manag.* **2011**, *61*, 1–15. [CrossRef]
32. Cansino, J.; Sánchez-Braza, A.; Sanz-Díaz, T. Policy instruments to promote electro-mobility in the EU28: A comprehensive review. *Sustainability* **2018**, *10*, 2507. [CrossRef]
33. Larson, P.D.; Viáfara, J.; Parsons, R.V.; Elias, A. Consumer attitudes about electric cars: Pricing analysis and policy implications. *Transp. Res. Part A Policy Pract.* **2014**, *69*, 299–314. [CrossRef]
34. Ozaki, R.; Sevastyanova, K. Going hybrid: An analysis of consumer purchase motivations. *Energy Policy* **2011**, *39*, 2217–2227. [CrossRef]
35. Beck, M.J.; Rose, J.M.; Hensher, D.A. Environmental attitudes and emissions charging: An example of policy implications for vehicle choice. *Transp. Res. Part A Policy Pract.* **2013**, *50*, 171–182. [CrossRef]
36. Mau, P.; Eyzaguirre, J.; Jaccard, M.; Collins-Dodd, C.; Tiedemann, K. The 'neighbor effect': Simulating dynamics in consumer preferences for new vehicle technologies. *Ecol. Econ.* **2008**, *68*, 504–516. [CrossRef]
37. Wolbertus, R.; Kroesen, M.; van den Hoed, R.; Chorus, C.G. Policy effects on charging behaviour of electric vehicle owners and on purchase intentions of prospective owners: Natural and stated choice experiments. *Transp. Res. Part D Transp. Environ.* **2018**, *62*, 283–297. [CrossRef]

38. Wang, S.; Fan, J.; Zhao, D.; Yang, S.; Fu, Y. Predicting consumers' intention to adopt hybrid electric vehicles: Using an extended version of the theory of planned behavior model. *Transportation* **2016**, *43*, 123–143. [CrossRef]
39. Ziegler, A. Individual characteristics and stated preferences for alternative energy sources and propulsion technologies in vehicles: A discrete choice analysis for Germany. *Transp. Res. Part A Policy Pract.* **2012**, *46*, 1372–1385. [CrossRef]
40. Nayum, A.; Klöckner, C.A.; Mehmetoglu, M. Comparison of socio-psychological characteristics of conventional and battery electric car buyers. *Travel Behav. Soc.* **2016**, *3*, 8–20. [CrossRef]
41. Jansson, J.; Nordlund, A.; Westin, K. Examining drivers of sustainable consumption: The influence of norms and opinion leadership on electric vehicle adoption in Sweden. *J. Clean. Prod.* **2017**, *154*, 176–187. [CrossRef]
42. Hidrue, M.K.; Parsons, G.R.; Kempton, W.; Gardner, M.P. Willingness to pay for electric vehicles and their attributes. *Res. Energy Econ.* **2011**, *33*, 686–705. [CrossRef]
43. Hackbarth, A.; Madlener, R. Consumer preferences for alternative fuel vehicles: A discrete choice analysis. *Transp. Res. Part A Transp. Environ.* **2013**, *25*, 5–17. [CrossRef]
44. Junquera, B.; Moreno, B.; Álvarez, R. Analyzing consumer attitudes towards electric vehicle purchasing intentions in Spain: Technological limitations and vehicle confidence. *Technol. Forecast. Soc. Chang.* **2016**, *109*, 6–14. [CrossRef]
45. Smith, B.; Olaru, D.; Jabeen, F.; Greaves, S. Electric vehicles adoption: Environmental enthusiast bias in discrete choice models. *Transp. Res. Part D Transp. Environ.* **2017**, *51*, 290–303. [CrossRef]
46. Lane, B.; Potter, S. The adoption of cleaner vehicles in the UK: Exploring the consumer attitude–action gap. *J. Clean. Prod.* **2007**, *15*, 1085–1092. [CrossRef]
47. Bjerkan, K.Y.; Nørbech, T.E.; Nordtømme, M.E. Incentives for promoting battery electric vehicle (BEV) adoption in Norway. *Transp. Res. Part D Transp. Environ.* **2016**, *43*, 169–180. [CrossRef]
48. Barth, M.; Jugert, P.; Fritsche, I. Still underdetected–Social norms and collective efficacy predict the acceptance of electric vehicles in Germany. *Transp. Res. Part F Traffic Psychol. Behav.* **2016**, *37*, 64–77. [CrossRef]
49. Beck, M.J.; Rose, J.M.; Greaves, S.P. I can't believe your attitude: A joint estimation of best worst attitudes and electric vehicle choice. *Transportation* **2017**, *44*, 753–772. [CrossRef]
50. Dumortier, J.; Siddiki, S.; Carley, S.; Cisney, J.; Krause, R.M.; Lane, B.W.; Rupp, J.A.; Graham, J.D. Effects of providing total cost of ownership information on consumers' intent to purchase a hybrid or plug-in electric vehicle. *Transp. Res. Part A Policy Pract.* **2015**, *72*, 71–86. [CrossRef]
51. Bühler, F.; Cocron, P.; Neumann, I.; Franke, T.; Krems, J.F. Is EV experience related to EV acceptance? Results from a German field study. *Transp. Res. Part F Traffic Psychol. Behav.* **2014**, *25*, 34–49. [CrossRef]
52. Adepetu, A.; Keshav, S. The relative importance of price and driving range on electric vehicle adoption: Los Angeles case study. *Transportation* **2017**, *44*, 353–373. [CrossRef]
53. Koetse, M.J.; Hoen, A. Preferences for alternative fuel vehicles of company car drivers. *Res. Energy Econ.* **2014**, *37*, 279–301. [CrossRef]
54. Franke, T.; Krems, J.F. What drives range preferences in electric vehicle users? *Transp. Policy* **2013**, *30*, 56–62. [CrossRef]
55. Higgins, C.D.; Mohamed, M.; Ferguson, M.R. Size matters: How vehicle body type affects consumer preferences for electric vehicles. *Transp. Res. Part A Policy Pract.* **2017**, *100*, 182–201. [CrossRef]
56. Shahraki, N.; Cai, H.; Turkay, M.; Xu, M. Optimal locations of electric public charging stations using real world vehicle travel patterns. *Transp. Res. Part D Transp. Environ.* **2015**, *41*, 165–176. [CrossRef]
57. Tal, G.; Nicholas, M.; Davies, J.; Woodjack, J. Charging behavior impacts of electric vehicle miles traveled-who is not plugging in? *J. Transp. Res.* **2014**, *2454*, 53–60.
58. Xydas, E.; Marmaras, C.; Cipcigan, L.M.; Jenkins, N.; Carroll, S.; Barker, M. A data-driven approach for characterising the charging demand of electric vehicles: A UK case study. *Appl. Energy* **2016**, *162*, 763–771. [CrossRef]
59. Plötz, P.; Funke, S.A.; Jochem, P.; Wietschel, M. CO_2 mitigation potential of plug-in hybrid electric vehicles larger than expected. *Sci. Rep.* **2017**, *7*, 16493. [CrossRef] [PubMed]
60. Nicholas, M.; Tal, G. *Transitioning to Longer Range Battery Electric Vehicles: Implications for the Market, Travel and Charging*; SAE International: Brussels, Belgium, 2017.
61. Morrissey, P.; Weldon, P.; O'Mahony, M. Future standard and fast charging infrastructure planning: An analysis of electric vehicle charging behavior. *Energy Policy* **2016**, *89*, 257–270. [CrossRef]

62. Caperello, N.; Tyreehageman, J.; Davies, J. I am not an environmental wacko! Getting from early plug-in vehicle owners to potential later buyers. In Proceedings of the Transportation Research Board Annual Meeting, Washington, DC, USA; 2015.
63. Langbroek, J.H.; Franklin, J.P.; Susilo, Y.O. Electric vehicle users and their travel patterns in Greater Stockholm. *Transp. Res. Part D Transp. Environ.* **2017**, *52*, 98–111. [CrossRef]
64. Wang, S.; Li, J.; Zhao, D. The impact of policy measures on consumer intention to adopt electric vehicles: Evidence from China. *Transp. Res. Part A Policy Pract.* **2017**, *105*, 14–26. [CrossRef]
65. Moon, H.; Park, S.Y.; Jeong, C.; Lee, J. Forecasting electricity demand of electric vehicles by analyzing consumers' charging patterns. *Transp. Res. Part D Transp. Environ.* **2018**, *62*, 64–79. [CrossRef]
66. Ferguson, M.; Mohamed, M.; Higgins, C.D.; Abotalebi, E.; Kanaroglou, P. How open are Canadian households to electric vehicles? A national latent class choice analysis with willingness-to-pay and metropolitan characterization. *Transp. Res. Part D Transp. Environ.* **2018**, *58*, 208–224. [CrossRef]
67. Franzò, S.; Frattini, F.; Latilla, V.M.; Foiadelli, F.; Longo, M. The diffusion of electric vehicles in Italy as a means to tackle main environmental issues. In Proceedings of the 2017 Twelfth International Conference on Ecological Vehicles and Renewable Energies (EVER), Monte Carlo, Monaco, 11–13 April 2017; pp. 1–7.
68. European Commission. *The Bologna Process: Setting Up the European Higher Education Area. 23/07/2015*; European Commission: Brussels, Belgium, 2015; Available online: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:c11088 (accessed on 19 September 2018).
69. Lebeau, K.; Van Mierlo, J.; Lebeau, P.; Mairesse, O.; Macharis, C. Consumer attitudes towards battery electric vehicles: A large-scale survey. *Int. J. Electr. Hybrid Veh.* **2013**, *5*, 28–41. [CrossRef]
70. Erdem, C.; Şentürk, İ.; Şimşek, T. Identifying the factors affecting the willingness to pay for fuel-efficient vehicles in Turkey: A case of hybrids. *Energy Policy* **2010**, *38*, 3038–3043. [CrossRef]
71. Saarenpää, J.; Kolehmainen, M.; Niska, H. Geodemographic analysis and estimation of early plug-in hybrid electric vehicle adoption. *Appl. Energy* **2013**, *107*, 456–464. [CrossRef]
72. Qian, L.; Soopramanien, D. Incorporating heterogeneity to forecast the demand of new products in emerging markets: Green cars in China. *Technol. Forecast. Soc. Chang.* **2015**, *91*, 33–46. [CrossRef]
73. Kraus, S.; Burtscher, J.; Niemand, T.; Roig-Tierno, N.; Syrjä, P. Configurational paths to social performance in SMEs: The interplay of innovation, sustainability resources and achievement motivation. *Sustainability* **2017**, *9*, 1828. [CrossRef]
74. Fiss, P.C. Building better causal theories: A fuzzy set approach to typologies in organization research. *Acad. Manag. Rev.* **2011**, *54*, 393–420. [CrossRef]
75. Woodside, A.G. Moving beyond multiple regression analysis to algorithms: Calling for adoption of a paradigm shift from symmetric to asymmetric thinking in data analysis and crafting theory. *J. Bus. Res.* **2013**, *66*, 463–472. [CrossRef]
76. Ragin, C.C. How to lure analytic social science out of the doldrums: Some lessons from comparative research. *Int. Sociol.* **2006**, *21*, 633–646. [CrossRef]
77. Fiss, P.C. A set-theoretic approach to organizational configurations. *Acad. Manag. Rev.* **2007**, *32*, 1180–1198. [CrossRef]
78. Salam, M.A.; Ali, M.; Kan, K.A.S. Analyzing supply chain uncertainty to deliver sustainable operational performance: Symmetrical and asymmetrical modeling approaches. *Sustainability* **2017**, *9*, 2217. [CrossRef]
79. Tóth, Z.; Thiesbrummel, C.; Henneberg, S.C.; Naudé, P. Understanding configurations of relational attractiveness of the customer firm using fuzzy set QCA. *J. Bus. Res.* **2015**, *68*, 723–734. [CrossRef]
80. García-Castro, R.; Aguilera, R.V.; Ariño, M.A. Bundles of firm corporate governance practices: A fuzzy set analysis. *Corp. Gov. Int. Rev.* **2013**, *21*, 390–407. [CrossRef]
81. Ragin, C.C.; Davey, S. *fs/QCA: Fuzzy-Set/Qualitative Comparative Analysis*, version 2.5; computer program; Department of Sociology, University of California: Irvine, CA, USA, 2014.
82. Lafuente, E.; Vaillant, Y.; Leiva, J.C. Sustainable and traditional product innovation without scale and experience, but only for KIBS! *Sustainability* **2018**, *10*, 1169. [CrossRef]
83. Latimer, A.E.; Martin Ginis, K.A. The importance of subjective norms for people who care what others think of them. *Psychol. Health* **2005**, *20*, 53–62. [CrossRef]
84. Fiss, P.C.; Sharapov, D.; Cronqvist, L. Opposites attract? Opportunities and challenges for integrating large-N QCA and econometric analysis. *Political Res. Q.* **2013**, *66*, 191–198.

85. Skaaning, S.E. Assessing the robustness of crisp-set and fuzzy-set QCA results. *Soc. Methods Res.* **2011**, *40*, 391–408. [CrossRef]
86. Khedhaouria, A.; Thurik, R. Configurational conditions of national innovation capability: A fuzzy set analysis approach. *Technol. Forecast. Soc. Chang.* **2017**, *120*, 48–58. [CrossRef]
87. Ewing, G.; Sarigöllü, E. Assessing consumer preferences for clean-fuel vehicles: A discrete choice experiment. *J. Public Policy Mark.* **2000**, *19*, 106–118. [CrossRef]
88. Egbue, O.; Long, S. Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. *Energy Policy* **2012**, *48*, 717–729. [CrossRef]
89. Al-Alawi, B.M.; Bradley, T.H. Total cost of ownership, payback, and consumer preference modeling of plug-in hybrid electric vehicles. *Appl. Energy* **2013**, *103*, 488–506. [CrossRef]
90. Sovacool, B.K.; Hirsh, R.F. Beyond batteries: An examination of the benefits and barriers to plug-in hybrid electric vehicles (PHEVs) and a vehicle-to-grid (V2G) transition. *Energy Policy* **2009**, *37*, 1095–1103. [CrossRef]
91. European Commission. *Erasmus Facts, Figures & Trends*; Publications Office of the European Union: Luxembourg; European Commission: Brussels, Belgium, 2014; Available online: http://ec.europa.eu/dgs/education_culture/repository/education/library/statistics/erasmus-plus-facts-figures_en.pdf (accessed on 30 October 2018).