

## CHOOSING THE TARGET AUDIENCE FOR THE SALE OF ELECTRIC CARS IN RUSSIA

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### Abstract:

**Purpose:** The prospects for the Russian electric vehicle market substantially depend on the awareness of representatives of the younger generation, those who will choose their own cars in the near future, about the advantages of these vehicles. The main aim of this research is to explore the possible links between the factors that determine the process of choosing an electric vehicle and the intention to purchase it.

**Design/methodology/approach:** The source of the data was the results of a survey of young people aged 17–30 who are potential consumers of electric vehicles. For determining design features of respondents who intend to purchase an electric vehicle, the multiple correspondence analysis was applied. The results of the multiple correspondence analysis correlate with those from the paired association analysis and the ordinal regression estimation, which makes research conclusions more confident.

**Findings:** Males aged 21–24 who own cars and decide either independently or taking their mothers advise to purchase a car for the family are most likely to purchase an electric vehicle. Females aged 17–20 who own cars and whose decision was influenced by their fathers are the least likely to purchase an electric vehicle. In Russia, the general public is not aware of those technological advances that have allowed car manufacturers to significantly improve the consumer properties of electric vehicles. All other things being equal (car class and price), choosing an electric car is still unlikely. Consumer prejudice is prevalent about unfavourable weather conditions, which allegedly impede the operation of electric vehicles.

**Research limitations:** It should be noted that the study was of a pilot nature. To obtain more reliable and accurate conclusions and build a high-quality model suitable for practical use (for example, in targeted marketing), it is necessary to increase the number of observations by at least 2.5–3 times.

**Practical implications:** Expanding the presence of electric vehicles in car-sharing companies would significantly improve the experience of using electric vehicles for young users seeking high mobility who have not yet purchased their own car. It would help to promote electric vehicles on social media where users can share their experiences.

**Social implications:** The socio-demographic characteristics of consumers are weak in explaining their purchasing intentions. Those who are concerned about sustainability issues are interested in buying. In Russia the streets in the historical centre of the cities are too narrow, this poses a threat not only to air pollution, but also to the health of residents.

**Key words:** consumer behaviour, electric cars, electric vehicles, sustainability

### Introduction

Rapid development of the electric vehicles industry in the world is an obvious fact that cannot go unnoticed and attracts researchers' attention: over the past few years, sales and investments in this type of vehicle have demonstrated exponential

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growth. According to consulting agencies, this type of transport may displace conventional internal-combustion engine automobiles as the technology of electric vehicles advances and their prices get lower as well as the cost of owning them. In 2019, the global sales volume approached 2.2 million units, according to the Wood Mackenzie Agency. World leaders of the automobile industry bring new models of electric vehicles to the market annually. It is expected that by 2025, the share of electric transport will be 15–25% of the total number of automobiles.

Issues of mass, or even noticeable penetration of electric vehicles into the Russian market remain controversial (due to underdeveloped infrastructure, severe weather conditions, etc.). According to the AUTOSTAT Analytical Agency, there were 6,300 electric vehicles in Russia, as of January 1, 2020, which is only 0.014% of the total fleet of passenger cars in the Russian Federation.

To reduce prices for electric vehicles significantly, the Eurasian Economic Union (EAEU), which includes Russia, Armenia, Belarus, Kazakhstan and Kyrgyzstan has declared cancelling customs duties on imported electric vehicles. That decision applies to new and used electric vehicles and has come into force in May 2020.

Prospects for the Russian electric vehicles market depend substantially on the awareness of representatives of the younger generation, those to choose their own automobiles in the near future, of the advantages of these vehicles. This paper presents the results of study of prospects for electric vehicles use in Russian, during which the following tasks were solved:

- factors that determine ultimately the interest of young Russian consumers in electric vehicles identified;
- model to predict demand for electric vehicles constructed;
- target segment of electric vehicle consumers in Russia described.

## **Literature review**

The problem of energy conservation and environmental protection is becoming increasingly relevant in the world (Bozhuk et al. 2019a; Bozhuk et al. 2019b). Electric cars (vehicles) are one of the concepts of green and sustainable transport systems. The digital economy is developing and consumer behavior is changing (Krasnostavskaja et al. 2020a; Krasnostavskaja et al. 2020b). The limitation of the electric battery and the resulting restrictions on driver mobility are a serious consumer problem that car manufacturers must address. This becomes especially clear on long journeys when it is necessary to charge an electric car.

The main aim of this paper is to examine the potential links between factors that determine the process of choosing an electric vehicle and the intention to purchase it. In this section, we will review research themes: characteristics of the electric vehicle itself, the experience of driving cars and electric vehicles, environmental awareness and incentives, innovative value, personal characteristics and beliefs of the consumer, environmental factors shaping normative beliefs.

There is no consensus in the literature on the socio-demographic characteristics of the target audience of electric car buyers, but there is a study that, in terms of age, young people (under 45) are more likely to buy electric cars (Higueras-Castillo et al.

2020). The authors of the study selected people 17-30 years old as the objects of research, taking into account the results of the analysis of literary sources, as well as the current state of development of the automotive industry in the country. It is assumed that these potential consumers will be able to pay at the moment of widespread adoption of electric vehicles in 10-15 years.

An analysis of the demand research on the electric vehicle market was the basis for the development of Table 1, which addresses aspects of the purchase of an electric vehicle.

**Table 1. Review of research papers on aspects of buying electric vehicles**

Considered aspect of the purchase	Research essence	Research paper authors
Characteristics of the electric vehicle itself	Travel distance, speed, purchase price, safety, fuel economy influence the choice	Ciarapica et al. 2013; Dudenhöffer 2013; Bühne et al. 2015; Franke et al. 2016; Thananusak et al. 2017; Karlsson 2017; Knez, Obrecht 2017; Darup, Guillen, Piulachs 2018
The experience of driving cars and electric vehicles	The average values of subjective norms, perceived behavioural control, attitudes and readiness to accept in experienced consumers are significantly higher than in inexperienced consumers	Miao et al. 2014; Muraya, Capehart 2015; Mangmeechai, Yuan 2018; Darup et al. 2018; Ling et al. 2019; Hinnüber, Szarucki, Szopik-Depczyńska 2019; Liu et al. 2020
Environmental awareness and incentives	The choice is determined by environmental awareness, the idea of reasonable consumption	Larson et al. 2015; Darup et al. 2018; Mangmeechai, Yuan 2018; Fyhri, Beate Sundfjor 2020; Jin, Yao, An 2020
Innovative value	Innovative consumers are particularly sensitive to the innovative aesthetic value of an electric vehicle	Sierzechula et al. 2012; Naor et al. 2015; Schmidt et al. 2016; Proff, Fojcik 2016; Rossini et al. 2016; Zhgulev et al. 2018; Nagel, Schumann 2020
Personal characteristics and beliefs of the consumer	Gender, age, vehicle ownership in family influence	Ling et al. 2015; Bennett, Kottasz, Shaw 2016; Darup et al. 2018; Ning et al. 2019
Environmental factors shaping normative beliefs (Subjective Norm)	Consideration should be given to the influence of government policies, media, social media	Dini, Washington, Hawkins 2013; Lim, Chen, Yap 2014; Malik, Prakash, Kapoor 2018; Sharida, Al-Hashimi, Hamdan 2020

Source: developed by the authors of the research.

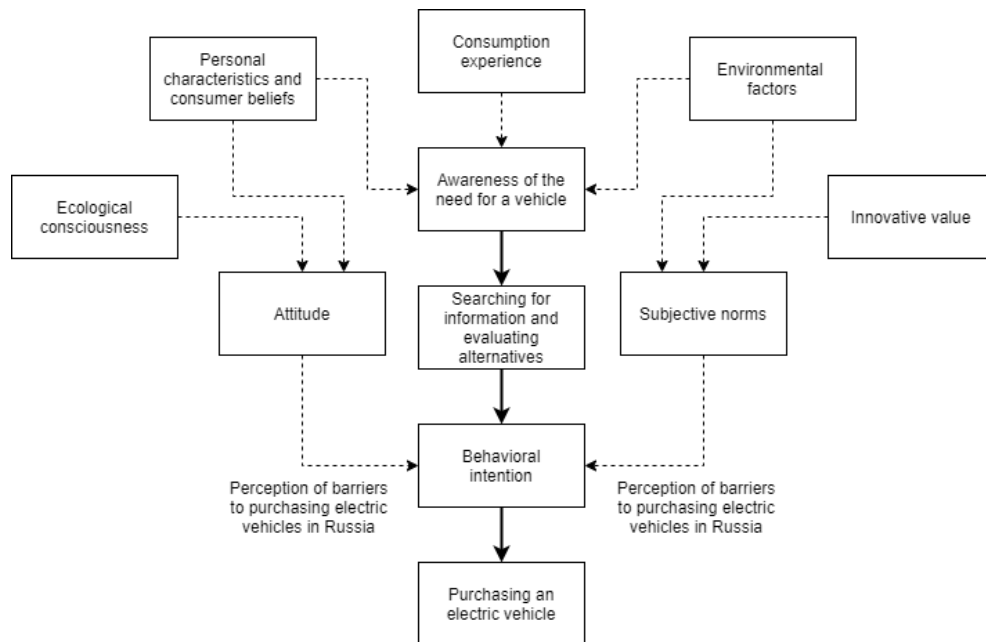
## Methodology

Articles from 2012-2020 were selected for the development of Table 1. The selection criterion for articles was the belonging of articles to economic and marketing topics, the state and trends of the electric vehicle market, the presence of a study of factors affecting the purchase of electric vehicles.

Results of the survey of young people aged 17–30, who are potential consumers of this type of transport, became the data source. There is a significant age asymmetry in the sample, i.e., young respondents (79.2% of all respondents are

18– 21 years old) dominate over those whose age is approaching 30. The initial data set contained questionnaire data submitted by 381 respondents. After “cleaning” the data, i.e., deleting questionnaires with omissions (more than 50 % of blank fields), the number of observations decreased to 371. The study included features that may be divided into feature-factors (9) and resulting attributes (12).

Factors included characteristics describing the respondent (including those of car user): age, gender, availability of a car in the family, person who influenced the choice of the car, frequency of car use, distance of trips. The analysis of research papers became the basis for the development of a model of factors that determine the process of choosing an electric vehicle and the intention to purchase it. This model is presented in Figure 1.



**Figure 1. Factors determining the process of choosing an electric vehicle and the intention to purchase it**

Source: developed by the authors of the research.

Data were analysed with SPSS computer application for statistical data processing. For determining design features of respondents who intend to purchase an electric vehicle, the multiple correspondence analysis was applied. The choice of this method is determined by the fact that most of the features are non-quantitative. The result of applying the multiple correspondence analysis is a representation of the original dependent variables in the lower-dimensional space (usually two-dimensional). Survey method: quantitative survey using the Internet. The study was conducted from 15.01.2021 to 15.02.2021.

## Results and Discussion

The females are on average less likely than males to purchase an electric vehicle (at the significance level of 3%). Those who frequently use cars with internal-combustion engine are less likely to purchase an electric vehicle than those who rarely use cars (at the significance level of 7%). Those who consider “environmental protection” or “health care” to be the reason for widespread use of electric vehicles in Europe, are more likely to purchase an electric vehicle than those for whom the said reason is “fashionable trend” (at the significance level of 0%). People at the age of 21 to 24 are most likely to purchase one (12% significance).

Generalizing the results on the paired relations, we may conclude that males develop a stronger intention to purchase an electric vehicle with age.

Based on the data in the multiple responses Table 2, coordinates for 28 values categories of 9 features in two new dimensions (integral variables) were determined.

**Table 2. Multiple responses based on “explicit” factors**

Feature	Category	Probability of purchasing an electric vehicle		
		unlikely	unsure	most likely
Gender	Female	63	81	83
	Male	25	41	78
Age	17–20	77	96	106
	21–24	8	15	36
	25–30	3	11	19
Availability of an automobile	Yes	65	85	119
	No	23	37	42
Person who influenced the choice of the car in the family	Father	41	66	63
	Mother	12	7	21
	Self	8	4	22
	Other	4	8	13
Frequency of use	Frequently	57	63	91
	Moderately	6	18	17
	Rarely	2	4	11
Trip distance	Long	28	46	67
	Average	28	19	34
	Short	9	20	18
Feasibility of having two automobiles in the family	Unfeasible	24	40	59
	Feasible	28	33	46
	Comfortable	36	49	56
Automobile is a strong source of pollution	No, absolutely not	1	3	8
	No	5	13	17
	I don't know	15	25	21
	Yes	54	53	70
	Yes, absolutely	13	28	45

Source: developed by the authors of the research.

People aged 21-30 were selected because, in the total number of their age groups, these people had a higher percentage of the choice of the answer “most likely”: 59.78% (55 respondents out of 92 respondents) versus 38.00% (106 respondents out of 279 respondents).

Summarizing results of the comprehensive statistical data analysis, we can offer the following profile of a potential Russian consumer of electric vehicles. Typical features values of that consumer are presented in Table 3.

**Table 3. Characteristics of the potential Russian consumer of electric vehicles**

Consumer characteristic (feature value)	Typical value
Gender	Male
Age	21–30 (years old)
Car availability	Yes
Person who influenced the choice of the car	Himself or his mother
He believes that the cause for the widespread use of electric vehicles in Europe are	Health care, environmental protection
He believes that the key problem of using electric vehicles in Russia is	Poor awareness of offer in electric vehicles
His opinion with regard to the Russians' interest in electric vehicles	They are interested

Source: developed by the authors of the research.

Males aged 21–24 who own cars and decide either independently or taking their mothers' advise to purchase a car for the family are most likely to purchase an electric vehicle. Females aged 17–20, who own cars and whose decision was influenced by their fathers, are the least likely to purchase an electric vehicle. It should be noted that the results of the multiple correspondence analysis correlate with those from the paired association analysis and the ordinal regression estimation, which makes our conclusions more confident. In Russia, electric vehicles are still considered an innovative product, and awareness of it remains poor.

## Conclusion

It should be noted that the study was pilot in nature. To obtain more reliable and accurate conclusions and build a high-quality model suitable for practical use (for example, in target marketing), it is required to increase the number of observations by a factor of 2.5–3, at least. Also, respondents over 30 years old should be added to the study. All other things being equal (vehicle class and price), the choice in favour of electric vehicle still faces a poor chance. Consumer prejudices with respect of adverse weather conditions that hamper operating electric cars allegedly, prevail. Expanding representation of electric vehicles in carsharing companies would improve significantly the experience in using electric vehicles by young users striving for high mobility, who have not purchased their own car yet.

Promoting electric vehicles in social networks, where users can share their experience would help too. Consumers' socio-demographic characteristics are weak in explaining their purchasing intentions. From the point of view of predicting consumer behaviour, features describing consumers' value orientation have demonstrated stronger influence.

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