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## The electric vehicle in spanish people under 45 years old: acceptance criteria

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Due to various social, economic and environmental reasons, since the beginning of the 21st Century, public administrations and companies are gradually making a clear commitment to electrically powered vehicles, both to cover urban and interurban trips. In this sense, successive improvements in technology, together with government incentives, mean that the electric vehicle is presented as a more sustainable, silent and ecological mobility alternative, which will progressively replace traditional combustion vehicles.

Taking this scenario into consideration, the main objective of the research is to determine the general positioning regarding the acceptance of electric vehicles by the population of young adults in Spain. The choice of this specific population to carry out the study has been based on their greater predisposition to adopting electric vehicles compared to other older age groups. The specific objectives are to know what the determining factors are for the purchase of electric vehicles, as well as their relationship with various variables such as environmental awareness, carrying out actions to favour the environment or the time between vehicle purchases. On the other hand, we want to identify the main drawbacks that this type of public detects in electric vehicles.

The study establishes the following hypotheses for the sociodemographic group studied: the price variable is and will continue to be the most determining factor in the acquisition of vehicles (H1), environmental factors do not have an excessive relative weight in the decision to purchase a vehicle (H2), the level of education influences the decision to opt for an electric vehicle (H3) and a greater rotation of vehicle purchases positively influences a potential acquisition of an electric vehicle (H4).



To meet the objectives and analyse the acceptance of electric vehicles among population groups of young adults, this research has combined quantitative and qualitative analysis methodologies. Thus, on the one hand, quantitative analysis of descriptive and bivariate statistics has been applied to the data from a survey carried out on people under 45 years old residing in Spain. On the other hand, a qualitative analysis has been made on the results of semi-structured interviews carried out with various personnel professionally related to the production, sale and repair of vehicles.

The survey was made on a sample of 283 adults residing in Spain during the months of February and March 2023, through various telematic channels, the most used by members of the youngest population groups. The technique used in choosing the sample was simple random probabilistic sampling. The questionnaire was made up of a total of 15 questions, divided into two blocks, one that delimited the profile of the respondents (sex, age, household income and academic level), and another that served to gather their opinion on electric vehicles and know the key factors for the purchase. After collecting and coding the data obtained from the survey, it was analysed using univariate and bivariate descriptive and inferential statistics with the IBM SPSS Statistics program.

The semi-structured interviews were carried out with twenty people who work in the automotive sector, considering the relevance of their opinions, testimonies and evaluations on the topic under study. Among those interviewed were production managers in automobile factories, dealership owners, dealership managers, sales managers, after-sales managers, vehicle rental agency managers or used vehicle sales managers. All of them were related to either the electric vehicle or the combustion vehicle.

The results of descriptive statistics obtained from the analysis of the data obtained in the survey indicate that, among the variables that the participants in the study consider decisive in the acquisition of a new vehicle, the most decisive is the price (81.6%), followed by fuel consumption (61.1%), design (44.5%), brand and model (38.5%) and comfort (32.2%). Aspects related to ecology appear far behind in terms of preferences (CO<sub>2</sub> emissions and other gases are only mentioned by 24% of the participants in the study), despite the high environmental awareness they claim to have (94.3 %).

At the time the study was carried out, 70.6% of those surveyed, in principle, did not show interest in buying or renting an electric vehicle. The key factors for the acquisition of an electric vehicle would be the offering of competitive prices (63.4%) and the need for fiscal or financial incentives for the purchase (61.6%). If they had to choose a single factor that would decide the purchase of an electric vehicle, 46.4% chose the price, 18.1% for the purchase incentives or discounts and another 18.1% for the increase in sites load. Only 8.3% of those surveyed chose improving the environment as a determining factor in deciding to buy a vehicle of this type. For the participants in the study, the main problem or drawback they encounter when purchasing an electric vehicle is its high cost (69.1%), followed by its low autonomy (55%) and the shortage of charging points (51.1%). To a lesser extent, they point to the pollution produced by electric car batteries when they reach the end of their useful life (18.1%) and distrust of a relatively new technology on the market (17.7%). Only 1.1% of those surveyed stated that they did not find any inconvenience or impediment to the acquisition and use of vehicles of this type.

Finally, when asked what type of vehicle they believed they would purchase in the future, 28.5% were in favour of hybrid vehicles (whether plug-in or not), 22.8% opted for gasoline-powered vehicles and 20.3% for diesel vehicles. Only 10.7% declared their willingness to purchase an electric vehicle and 2.8% one powered by hydrogen. 14.9% were not clear about the future purchase option.

The results of the interviews warn that the prospects for a progressive replacement of internal combustion vehicles with electric ones, derived from greater acceptance by buyers, are still distant in Spain. It is noted that the most critical factors for a favourable reception of electric vehicles are the limitation in autonomy, the lack of infrastructure and the long charging time. Also notable is its high sales price, rapid battery discharge in cold weather, and low loading and towing capacity. In any case, it is estimated that its demand will increase in the coming years, due to the contribution of this type of vehicles in reducing air pollution, its lower number of breakdowns and the tax incentives for its acquisition. Negatively influencing are the excessive volatility of electricity prices, the limited reserves of raw materials to manufacture batteries and a probable shortage of qualified personnel to provide repair services, all of which could increase the



costs of use. Precisely for this reason, it is estimated that young adults are not going to adopt electric vehicles too quickly, especially for economic reasons.

Among the main conclusions that the study provides is the probable progressive increase in the demand for electric vehicles, despite the fact that their high purchase price represents a very important barrier. The research, like various previous studies carried out in different Asian and European countries, corroborates the first of the starting hypotheses, since price is the most determining variable in the acquisition of a new electric vehicle for the participants in the study. The second hypothesis of the study is also endorsed, since environmental factors do not have an excessive relative weight in the decision to purchase a vehicle, it could also be endorsed by the results of the study (only 8.3% of the participants considered that environmental improvement was the main determining factor in the purchase).

On the other hand, the research showed that, in the population groups made up of young adults, based on the results of the bivariate statistical analysis, there is a greater interest in purchasing an electric vehicle in women than in men, in people with a higher level of education completed and in those who show a greater frequency of changing vehicles. In this way, the third and fourth of the proposed hypotheses are ratified, referring to the level of studies completed and the rotation of the vehicles acquired.

In short, the research carried out, as a whole, shows that, in a similar way to what similar studies have determined in other countries, the transition from the combustion to the electric vehicle by the population of young adults in Spain, despite having a greater predisposition towards responsible and sustainable forms of consumption than other age groups, will not be excessively fast, as a result of the joint effect of high prices and lower purchasing power.