

Limits of sustainability in electric cars, qualification of goods based on symbolic values

Limites da sustentabilidade dos automóveis elétricos, qualificação de bens a partir de valores simbólicos

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ABSTRACT

The value of a good is not something fixed and objectively given but results from social valuation processes in which value is constructed. This process is fundamental for the functioning of markets, as they depend, among other things, on the ability of social actors to evaluate the qualities of goods and compare them in terms of value. In this way, the valuation process considers different criteria that often compete. The significant growth in the sale of electric cars in Brazil points to the formation of a market niche, with consumers willing to invest in new propulsion technologies, which, in theory, are more sustainable than conventional cars. From this context, the research seeks to investigate, through interviews with owners, the role of symbolic values in qualifying "sustainable" goods, such as electric cars. Data analysis points to the mobilisation of functional and symbolic values, although imaginatively appropriate, as fundamental criteria for the acquisition of cars.

Keywords: Market. Valuation. Electric Car. Sustainability.

RESUMO

Sabe-se que o valor de um bem não é algo fixo e objetivamente dado, mas resulta de processos de valoração social nos quais o valor é construído. Esse processo é fundamental para o funcionamento de mercados, pois estes dependem, entre outras coisas, da capacidade de os atores sociais avaliarem as qualidades de um bem, em relação umas às outras, e compará-las em termos de valor. Dessa forma, o processo de valoração leva em consideração diferentes critérios que muitas vezes concorrem entre si. O expressivo crescimento na venda de automóveis elétricos, no Brasil, aponta para a formação de um nicho de mercado, com consumidores dispostos a investir em novas tecnologias de propulsão, em tese, mais sustentáveis que os automóveis convencionais. A partir desse contexto, a pesquisa busca investigar, por meio de entrevistas com proprietários, o papel de valores simbólicos no processo de qualificação de bens "sustentáveis", como o automóvel elétrico. A análise dos dados aponta a mobilização de valores funcionais e simbólicos, ainda que imaginativamente apropriados, como critérios fundamentais para a aquisição dos automóveis.

Palavras-chave: Mercado. Valoração. Automóvel elétrico. Sustentabilidade.

1 INTRODUCTION

According to data from the International Energy Agency (IEA), the market share corresponding to the global sale of electric cars surpassed the mark of 10 million units (13%) in 2022, which represents a record and is considerable growth when compared with previous years (IEA, 2022). It is no coincidence that the resurgence of this form of motorisation occurs amid a series of social, political and economic issues that have put pressure on the automotive market and its *modus operandi*.

Despite being relatively distant from leading countries in electrification, Brazil has seen significant growth in the sale of electrified vehicles¹ in recent years. According to data from the Brazilian Electric Vehicle Association (ABVE), around 2.5% of cars sold in 2022 (49,245 units), including plug-in and conventional hybrids, were electrified. This represents 41% growth in comparison to 2021 (34,990) and 149% to 2020 (19,745) and becomes even more relevant when compared to the performance of the automobile and light commercial market as a whole (-0.85%) during the same year (Fenabrave, 2023).

This significant evolution of the electrified vehicle fleet indicates sustained growth in the sale of electrified cars in Brazil and the formation of a market niche, with consumers willing to invest in new vehicle propulsion technologies, which are theoretically more sustainable than conventional cars. Changes of this scale and nature have been framed within the sociotechnical transitions towards sustainability (Geels, 2019; Köhler *et al.*, 2019), since this change would involve radical transformations towards new types of sociotechnical systems. However, little is known about the motivations and criteria (economic, environmental) that have led consumers to make this choice. Therefore, it would be appropriate to investigate which factors influence the decision-making processes for purchasing these automobiles in Brazil and their consequences for a possible transition.

This type of questioning places us in an important debate about the role played by social relations, classification devices, rules and cultural meaning in market construction and functionality (Carneiro, 2017). More precisely, it places us within the debate on how values and forms of evaluation are constructed and given new meanings in market exchanges beyond price mechanisms. These exchanges would be mediated by judgment devices (Karpik, 2010) and permeated by more or less conscious efforts to categorise, standardise and naturalise socially constructed behaviours and rules (Fourcade; Healey, 2007).

Therefore, this research sought to investigate the experience of these owners with electrified cars and the values mobilised for their acquisition in the national context, as well as their relationship with climate-environmental aspects or other as-of-yet unmapped reasons. The paper is part of a theoretical framework that explores evaluation criteria and reveals the devices, institutions, or social and cultural structures that support and activate them (Lamont, 2013). On that account, we seek to analyse the values mobilised to acquire electrified cars within the national context. And what is the role of instruments and symbolic values in the process of qualifying certain goods, such as the electric car, as being "sustainable" in this context?

The paper seeks to understand which factors influence the decision-making processes for purchasing electric cars and the role played by symbolic values in the valuation process by (1) identifying the meanings and values mobilised by electric car owners and (2) analysing the decision-making processes and criteria used to qualify their choices.

Considering this theoretical framework, and with the Brazilian electrified car market as the unit of analysis, semi-structured interviews were carried out with owners of electrified cars between November 2021 and June 2022. Interviewees were selected from intentional sampling (Flick, 2009) based on the ownership and type of vehicle propulsion. From this sample, eight owners of electrified cars with different types of propulsion, four battery electric vehicles (BEV) and four hybrids (PHEV+HEV), were interviewed.

The interviews were organised and categorised through content analysis, which made it possible to identify the meanings and values mobilised by consumers; the decision-making processes, and the criteria used to qualify their choices.

The proposed approach has great theoretical relevance for researchers of valuation and evaluation processes in markets that are permeated by environmental issues and values, such as with electrified automobiles. The topic is also important for those interested in the direction of the national automotive market and mobility in large urban centres. After all, this change potentially engenders a series of transformations in the means for transport and recharging. Furthermore, in social, economic and geopolitical terms, this is a significant issue for a country like Brazil, a climate powerhouse regarding renewable sources with a consolidated automotive industrial park, but without great relevance in the electric vehicle market, until now.

In addition to this introductory section, the article is organised into four more sections. The following section will present the mobilised theoretical framework and contextualise the market based on secondary data. After that, the following section will present the interlocutors and methodological procedures. This will be followed by an analysis of the meanings and values attributed by owners of electrified cars. Finally, concluding remarks will be made, pointing out some reflections on the process of valuing electric cars and the limits of symbolic values.

2 MARKET AND VALUATION

Markets are spaces of institutionalised social relations where a certain good or service is distributed through a commercial exchange. In turn, these relationships of social exchange presuppose the existence of prior agreements on the value of a good or service and the establishment of a process capable of transfiguring that good or service into something marketable.

According to Lamont (2013), these processes involve: intersubjective agreements on a matrix or set of references by which a "good" is compared; negotiations and conflicts over appropriate judging criteria and legitimate judges; and the establishment of value in a relational process (or by indexes) involving distinguishable and comparable "goods." In the case of markets, these elements are considered central to understanding both the processes of constituting goods and services into commodities and the mechanisms for producing the value of a good or service.

Brazil has the world's 7th largest domestic vehicle market (Anfavea, 2023). Since its origins, the sector has been a strategic area for the country's economic development and social modernisation projects. However, as mentioned above, the worsening of issues related to polluting emissions, public health, congestion in large cities and impacts on the environment, added to the recent international economic and health crises, have created major challenges for the automotive industry and driven important changes in the sector.

In response to these new regulatory requirements, social expectations and new competitors in the market, many automakers have invested in developing and offering electric models. In Brazil, as mentioned above, this can be seen in the significant growth in sales of electrified cars in recent years. This growth contrasts with the downward trend in new car sales in recent years, attributed by Fenabrave to the Covid-19 health crisis and the crisis in the supply of semiconductors for vehicle assembly.

According to data compiled by ABVE, the fleet of electrified cars in circulation in Brazil is 126,504 cars and light commercial vehicles (2012-2022). However, a detailed fleet analysis reveals some important characteristics of these vehicles. These include the predominance of conventional hybrid vehicles, with emphasis on Toyota as the leading manufacturer, responsible for around 60% of the electrified fleet in Brazil; the absence of models belonging to smaller categories (compact and sub-compact); and the

massive presence of several sport utility vehicles (SUV) and extra-large vehicles (Wolffenbuttel, 2021). This points to an increased value being given to larger and hybrid cars.

Another interesting aspect is the average price of cars and the significant number of premium manufacturers in the fleet. This reveals financially restricted access to electrified vehicles. In part, this is due to the production costs of electric cars, which are 10-30% higher than internal combustion cars (Bloomberg, 2021), but also to the national tax structure that tends to favour the import of electrified vehicles². The reduction in import tax allows the additional price of the electric propulsion system to be absorbed in premium automobiles without a significant increase in the price for the final consumer since the propulsion system represents a smaller portion of the total cost compared to conventional automobiles. In other words, already expensive cars remain expensive, but now with greater energy efficiency and lower polluting emissions.

On the other hand, these data demonstrate that the strategy of national production of conventional flex fuel hybrid automobiles has proven successful. This strategy allows for a relatively lower production cost, as in these models, the batteries are less expensive, as they are only used to store the energy the regenerative braking system recovers. In addition, flex hybrid vehicles enjoy tax benefits – a reduction of three percentage points (3%) in the IPI (Tax on Industrialized Products) rate – in relation to conventional vehicles of similar class and category, under the Federal Government program "Rota 2030 - Mobilidade e Logística".

It is no coincidence that conventional hybrid cars (HEV) make up the majority of the electrified fleet, around 70% of the total. This type of propulsion is, in general, less efficient when compared to the energy consumption (in MJ/km) of 100% electric cars powered exclusively by batteries (BEV). However, it benefits from incentive policies (reduction in IPI, Import Tax and licensing in some States). However, this predominance of conventional hybrids has been threatened by the growth in sales of plug-in hybrids and the expansion in the supply of BEV models in Brazil, including the recent announcement of the installation of a factory by the Chinese automaker BYD in Camaçari (BA), on the premises of the former Ford factory.

Another important element for this market configuration is the incipient car charging infrastructure. According to the Alternative Fuels Infrastructure Directive (Afid), the recommended ratio of public chargers to electric vehicles is 0.1, that is, 1 charger for every 10 vehicles (IEA, 2021). In Brazil, estimates suggest that there are around 840 public and semi-public charging stations for 21,173 cars with connection to the external grid (BEV+PEHV), a ratio of 0.04 chargers per vehicle.

Much of this infrastructure is concentrated in large metropolises in the south and southeast of the country and strategic corridors, where vehicles travel to transport goods and passengers (PNME, 2022). This reinforces the preference for hybrid and plug-in hybrid cars, as the lack of publicly accessible fast chargers tends to block potential buyers of purely electric vehicles, especially when they do not have access to private charging. As stated below, the absence of an ample charging infrastructure appears to be one of the main disadvantages listed by interviewees.

In short, it is a relatively new and expanding market in which the issue of the opacity of commercial exchange (Granovetter, 1985; Polanyi, 2012) becomes even more relevant, given the various uncertainties emerging from its recent development and the differences between electric cars and conventional cars. Vehicle autonomy, safety regarding accidents, charging infrastructure, range anxiety, the electric resale market, environmental impacts, manufacturer warranty and after-sales services –all aspects intertwined with insecurity and decision-making involved in the exchange, which makes it possible to highlight the symbolic values and instruments mobilised to evaluate and qualify this product.

3 BUILDING THE VALUE OF ELECTRIC CARS FROM THE OWNERS' PERSPECTIVE

As previously stated, the value of a good is not something fixed and objectively given but results from social valuation processes in which value is constructed (Aspers; Beckert, 2011). This process is fundamental for the functioning of markets, as they depend, among other things, on the ability of social actors to evaluate the qualities of goods and compare them in terms of value. In this sense, evaluating something means measuring it and comparing it according to a scale; Valuing, in turn, is something more comprehensive, as it involves the different ways of valuing a product and the different scales through which the value of a good can be assessed (Stark, 2011).

The valuation process considers different criteria – aesthetic, moral and economic (monetary) – which often compete with each other and can lead to conflicts in assessing the value of an asset. This is why, in some situations, moral values can impede markets, as in the case of trafficking in people and organs. On the other hand, moral values can also contribute to the value of products on the market, as is the case with organic products (Niederle; Radomsky, 2017).

In the case of the electrified car market, the issue of environmental problems and the potential reduction in impacts caused by their use, compared to internal combustion cars, is something that, in theory, would increase the value of electric cars. According to a study carried out by Noppers *et al.*

(2014), in the Netherlands, the adoption of sustainable innovations is strongly driven by environmental and symbolic motives. Regarding electric cars, the analysis revealed that instrumental attributes (such as purchase price, car weight and the number of seats) were less important than environmental and symbolic attributes regarding owner purchasing decisions. The interest and acceptability of sustainable innovation increased when participants evaluated instrumental attributes more negatively, suggesting that instrumental disadvantages of sustainable innovations can sometimes reinforce their positive signal.

However, research conducted by Ingeborgrud and Ryghaug (2019) revealed a reinforcing dynamic between practical and symbolic values in the successful adoption of electric cars in Norway. The study was done using in-depth interviews with owners, and it showed that comfortable driving experiences and various economic benefits granted by the government were also fundamental from a symbolic point of view, as they encouraged the acquisition of electric vehicles and transmitted a strong signal by the national government that electric cars were an environmentally friendly mobility choice.

In Brazil, a recent survey commissioned by Google showed that the main reasons for purchasing electric cars among potential interested parties were: technological appeal, 37%; cost efficiency and exemptions, 35%, and concern for the environment, 27% (Carvalho; Bonazzi; Guedes, 2023). The interviews with the owners in this research pointed to similar values. However, the dynamics in the valuation process did not occur exclusively but sought to accommodate the different sources of value.

However, before delving deeper into the analysis of the interviews, it is worth discussing briefly the profile of the interviewees, taking into account the factors considered for selection. Table 1 summarises the main information collected about the interlocutors and their cars. The interviewees were selected based on recommendations from acquaintances, members of an owners' association, and participants in a network of people with a general interest in electric mobility. It should be noted that the intentional sample was concentrated in Brazil's south and southeast regions, where most electric cars are registered, and sought to cover different types of vehicles.

Table 1 | Profile of interlocutors

Name	Age	City/State	Profession	Automobile	Type of Vehicle
João	49	Caxias do Sul/RS	Mechanical Engineer	Volvo S60/2020	PHEV
Ana	66	Campinas/SP	University Professor	Toyota Prius/2013	HEV
Pedro	60	São Paulo/SP	Electronic Engineer	BMW i3 REX/2019	PHEV[3]
Rafael	42	Campo Limpo Paulista/SP	Mechanical Engineer	Caoa Chery Arrizo 5e/2019	BEV
Paulo	78	Curitiba/PR	Banker/ Retired	Toyota Corolla/2020	HEV
Edson	55	Guarulhos/SP	Hospital Manager	Mini Cooper/2021	BEV
Mauro	41	Petrópolis/RJ	Entrepreneur	Chevrolet Bolt/2017	BEV
Luiz	36	São Paulo/SP	Banker/App Driver/ Youtuber	JAC IEV40/2019	BEV

Source: Prepared by the author.

This is a relatively homogeneous group in which everyone has completed higher education, has the financial means to purchase a high-cost car, and has more than one car in their family (except Luiz, who owns just one car). Furthermore, the vast majority are men over 40 years old and occupy important positions in their work organisation. In other words, we are talking about a group with access to information and mostly from the upper classes.

Another important aspect to be mentioned is the fact that some of them (Mauro and Luiz) are members of an association of interests directly linked to the topic of electric mobility, the Brazilian Association of Innovative Electric Vehicle Owners (Abravei) - a network of contacts used to evaluate quality criteria, resolve common doubts and support owners.

4 THE INCREASED PERCEIVED VALUE OF ELECTRIC CARS

According to Aspers and Beckert (2011), the value of a good or service can be distinguished analytically between functional and symbolic value. Functional value derives from the good's property to change the world's state based on its physical effect. Symbolic value refers to the meaning of a good or service for its owner, its social environment, and its physical effects.

Beckert (2011) also distinguishes symbolic value into positional and imaginary dimensions. In both dimensions, the value of the good is based on the attributed qualities that transcend its materiality. However, in the case of positional value, others must attribute symbolic meaning to the property, thus serving as a basis for classifying the owner, giving him a certain social identity. The buyer himself attributes the imaginary, symbolic value, even though this reflects socially constituted values and moral orientations. The latter can be characterised as transcendental ideals and values that alter the owner's consciousness. That is, goods that evoke images based on symbolic associations with desired events, people, places or values but whose unity exists only as a mental construction (Beckert, 2011).

In this sense, goods such as the electric automobile would not only position their owners in social space through their symbolic significance, but they are also symbolic representations of adopted ideals and values (sustainability, freedom, efficiency) that can be imaginatively appropriated through their purchase (Aspers; Beckert, 2011). Table 2 summarises the values attributed by interviewees in this typology.

Table 2 | Types of values mobilised

Functional	Value	
	Symbolic	
	Positional	Imaginary
Less maintenance	Economically rational	Transportation efficiency
Less consumption		
Less taxes		
More safety	Technological vanguard	Individual freedom
Less noise/vibration		
Embedded technology		
Less CO2 emissions	Environmentally responsible	Sustainability
Renewable energy matrix		
Less polluting emissions		

Source: Prepared by the author.

Although symbolic values are not necessarily linked to functional values, it is possible to draw a relationship between them, as the material qualities acquire symbolic meanings. For example, functional values attributed to the electric car, such as lower CO2 and polluting emissions, contribute to creating an "environmentally responsible" identity for the owners and its association with intangible values, with somewhat unclear links to a sustainable future.

The values attributed by owners, whether functional or symbolic, are directly linked to the valuation process in the automobile market as they express intersubjectively shared qualifiers sought in commercial exchange. The analytical dimensions indeed overlap in the interviewees' valuation process, as can be seen in the statement below:

I think, man, first of all, there's a sense of responsibility, you know, you're already thinking about polluting emissions, etc. I find the experience of driving an electric car very pleasant, in terms of silence, comfort, even performance, torque, acceleration, etc. I think the electric experience is really cool. So I think that a mix of all these things, you are already following a trend, in some way contributing to the reduction of emissions, and it is a pleasant experience, an experience of comfort and silence that the electric vehicle also provides (JOÃO, mechanical engineer, 49).

In this way, the functional value, the quieter and more comfortable car, aligns with the symbolic value and the desire to meet collective expectations of responsibility and emissions reduction. In some cases, the imaginary symbolic value is expressed as a desire to "improve the planet for those who are arriving" (Pedro, electronic engineer, 60).

However, the issue of the environmental impact of electric vehicles is widely controversial and full of contradictions. Mainly regarding the emissions calculation methodology used and the aspects considered (Messagie, 2014; Nordelöf *et al.*, 2014). Methodologies that consider GHG emissions associated with energy production and vehicle propulsion (wheel-to-wheel) present more positive results than those that also consider the manufacturing of batteries and the end of their useful life (analysis of complete life cycle).

A second factor that directly affects this calculation is the electrical matrix in which these automobiles operate. In Brazil, where the electrical matrix comes 83% from renewable sources (EPE, 2021), the GHG emissions linked to electric cars end up being lower than in countries more dependent on fossil energy sources. This configuration aligns with the values of those interviewed who were concerned about GHG emissions and their personal energy matrix. A more radical example is homeowners who

understand the possibility of generating electricity at home through photovoltaic panels as a source of significant value, not only based on monetary criteria but also as a sustainable and independent form of supply.

Everything in the house is electric, man, even the toothbrush [laughs]. When you have energy production in your home you begin to have the freedom that comes with it. You are producing energy locally. It is a whole concept, it is not just a car, it is a concept of sustainability: you produce, enjoy and do not pollute. And doing this in your private sphere is a libertarian way (Mauro, businessman, 41).

In the same sense, embedded technology and the possibility of using household electricity as a supply source are symbolically signified as attributes that would position owners in a technologically avant-garde social category. The aforementioned freedom concerning gas stations and possible stoppages and sudden fluctuations in fuel prices, seen as a form of "empowerment" for owners in the face of these possible fluctuations, is more of an imaginary value since, even if the "fuel is indoors" the transport system is collective and depends on a series of factors that go beyond the individual scope. This source of value was only reported by BEV vehicle owners.

On the other hand, owners of HEV and PHEV vehicles, when justifying their choices, pointed to the lower dependence on charging infrastructure, or independence in the case of conventional hybrids, as a positive aspect. In the case of plug-in hybrids, the possibility of running with the combustion engine or the electrical engine, alternatively, is seen as a source of value since the number of chargers available is still considered small, especially on highways and cities in the countryside. The incipient charging infrastructure is considered, together with the price of cars, the main disadvantage for owners.

The same can be seen when we look at the values linked to economic rationality. The electric car is valued for potentially reducing the emission of pollutants and greenhouse gases and enabling long-term savings (payback), as illustrated in the following answer on the decisive factors for choosing an electric car.

First of all, not just me, but perhaps even the corporate world is recognising that it's a question of savings. If we calculate it, I saved 15 thousand BRL per year between fuel, IPVA and maintenance. So that was my savings per year. This means what, at first, is what companies are doing today, a company doesn't buy 1,200 electric trucks because it's going to... it's going to explore this too, the concept of sustainability, but it's not sustainability, it's business, it's pure capitalism in this relationship of savings and maintenance. [...] So if we analyse this first concept that leads someone, making a calculation, it is the issue of maintenance, the economic issue, and then comes the issue of sustainability, the environment, you stop emitting CO2, you contribute to everyone's environment, right (Edson, hospital manager, 55).

However, these symbolic values are not separated from the monetary value in the valuation process. Market research shows that consumers' willingness to pay more for electric cars, even though they agree with the potential of electric cars to reduce environmental impact, decreases as their price increases in relation to conventional cars. According to the study (Heineke, 2020), only 3% of respondents were willing to pay more than 30% more than vehicles with internal combustion engines for battery electric vehicles.

Again, the economic (monetary) criterion is considered relevant for the owners' evaluation. The mobility survey corroborates this data, carried out by SAE (SAE Brasil; KPMG; Autodata, 2021), which points out, among automotive industry executives and vehicle consumers, the acquisition cost is one of the main obstacles to electric vehicles in the market.

However, the issue of acquisition cost, when approached specifically, presents nuances related to other criteria (moral, technological, aesthetic) involved in the valuation process. In general, owners judge the price fair when considering factors such as the level of technology development, low sales volume, the

benefits involved, the tax burden and the benefits to health and the environment. The excerpt below exemplifies this attitude towards the issue of price.

I made an extravaganza, I don't think it's fair, because it was very expensive, [...] but, on the other hand, I thought that to fulfill this desire I had, I wanted to have something more modern in terms of concept. Because I think we have to pay the costs of our impact on the planet. That's my point, so we have to pay for this. (Ana, university professor, 66).

In this case, we can see a movement towards objectification (pricing) of subjective values, such as the impacts of human activity on nature, increasing the subjectively experienced value. This is what Fourcade (2011), when studying civil cases involving oil spills in the United States and France, calls the feedback loop from monetary valuation to social representations and practices. Based on Simmel's sociology (1978), the author argues that the relationship between subjective value and objectified value is not unidirectional but dialectical. This is because the value people attribute to an object may be connected to the purchase conditions and the monetary sacrifice made at the time of purchase.

The same can be said about the cost of being at the forefront of a technological trend. There is a movement towards pricing value based on the level of development and diffusion of technology, which is then subjectively experienced as something positive and inherent to the role of a trend promoter.

It's fair due to the level of technological development. I think it's a technology that still has a lot to evolve, the cost of batteries has to go down, more adoption, etc. I think this is also something I usually talk about, when you purchase an electric vehicle and promote this electric vehicle, in some way you are also contributing to this happening in the future in a more intense way and with that the entire cost goes down (João, mechanical engineer, 49).

This feedback dynamic from monetary valuation to social representations is mainly based on the symbolic value of some goods. That is, in intersubjectively shared meanings, which are established in the community and emerge in social practices.

Despite shared meanings, these values are mainly based on the individual use of cars. When faced with questions regarding the main problems and trends in urban mobility, most interviewees pointed to the individual use of cars as a problem to be overcome. In this sense, there is a certain awareness about the limits of the individual use of the electric car to respond to these problems and achieve the imaginary values associated with it (efficiency, freedom and sustainability). However, these problems are understood as collective and dependent on structural solutions.

So, I don't know if changes for society would be something so dramatic. In fact, they will converge towards a less polluted environment, so in this sense, yes, this is the great contribution of the electric vehicle, right. Now, for example, the electric vehicle will not contribute to reducing traffic jams. This continues, because both electric or combustion continue to occupy the same space on the street. In this other aspect, absolutely nothing changes, it changes in the sense of being less contaminating, etc. I think so, but with this... with this limitation of vision. (Paulo, banker, 78).

In other words, even though the issue of socio-environmental problems can be superimposed as a source of relational and symbolic value, as a value attributed by the community and by the owner in the construction of their identity, the acquisition of an electric car for private use appears as an individual response that is thus subject to limits that only coordinated action could adequately respond to.

5 FINAL CONSIDERATIONS

As seen in the previous sections, although representing a modest portion of total car sales, the national market for electrified cars has shown significant growth in recent years. The fleet analysis revealed the predominance of conventional hybrid vehicles, with a special participation of flex-fuel hybrids produced by Toyota. This aspect points to a technological dispute still open in the fleet's composition and the continuity of the internal combustion engine, associated with renewable sources, as a "sustainable" alternative. The significant presence of premium cars belonging to large categories, such as SUVs and extra-large models, is another element that draws attention due to its apparent contradiction with the ideal of efficiency.

In a related manner, the profile of the owners interviewed corresponds mostly to men over 40 years old who have completed higher education, are well-informed, and have sufficient financial conditions to purchase a high-cost car. This profile is partly due to the cut proposed by the intentional sample, which sought to cover different types of vehicles. On the other hand, it reflects the willingness of this profile to participate in research on the topic and externalise their criteria and justifications for the acquisition.

Regarding the different types of propulsion, it was possible to perceive different expectations concerning the charging infrastructure network, with owners of HEVs and PHEVs being more reticent about this dependence. Another important difference was the fact that BEV owners perceived autonomy in relation to gas stations as a source of value, both monetary and symbolic, for the electric car.

Despite these differences concerning recharging, all owners mobilised functional and symbolic values as criteria for purchasing their cars. It is worth noting that the acquisition cost is perceived as a disadvantage, an initial barrier, but at the same time, it is something that can be subjectively valued as the price to be paid for the impact of human activity on the planet, or for being part of a technological vanguard. Therefore, there is an overlap between the functional value, the desire for a more economical, efficient, silent and comfortable automobile, and the symbolic value, the desire to meet collective expectations of responsibility and reduction of greenhouse gas or polluting emissions.

In turn, the analysis of the criteria mobilised in valuing the electric car showed that the symbolic representations of adopted ideals and values (sustainability, freedom, efficiency) are imaginatively appropriate and have a connection far from reality. This is especially true regarding greenhouse gas emissions and the life cycle analyses that calculate all-electric car production chain impacts, which are subject to methodological controversies.

It is worth mentioning here that although recent studies (Mera *et al.*, 2023) robustly point to lower GHG emissions (fuel/electricity cycle + vehicle cycle) from electric vehicles, the ideal of sustainability is not restricted to the emission of gases. In particular, in the case of SUVs and larger vehicles, it is worth highlighting that the Hummer EV cannot be considered a sustainable option because it is powered by electricity and emits fewer gases than the conventional version. Therefore, in these situations, there would be an accommodation of environmental contradictions, the result of a mismatch between awareness of the climate emergency and the effective change in daily practices (Giddens, 2009).

Therefore, sustainability and concern about pollutant and greenhouse gas emissions are essential for electric car owners to help position them in the social space through their symbolic significance. However, this value appears mainly as a consequence of the economic value and energy efficiency linked to the electric car. This look at the valuation process allows us to see a significant and growing weight of the socio-environmental agenda for owners, pointing to the value given to using renewable sources, including in the domestic sphere, and low emissions. On the other hand, the relevance of functional values linked to individual use shows that this consumption is unlikely to be translated, over the short term, into major sociotechnical transitions that correspond to the imaginary values of freedom, efficient transport and sustainability.

Finally, it is worth mentioning that the functional values mobilised for the acquisition of electrified cars are in relative agreement with the symbolic values and that most interviewees are aware of the limits of car electrification, especially regarding their individual use. These limits concern the differences in focus (individual and collective) in the use of means of transport and the contradictions related to political choices that prioritise certain modes over others.

NOTES

1| The electrified automobile category covers: battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV) and conventional hybrid electric vehicles (HEV), without recharging via the electrical grid.

2| Camex Resolutions No. 97/2015, 27/2016, eliminated the Import Tax (II), which was 35%, for electric propulsion or hydrogen-powered vehicles and reduced it between 0% to 7% for hybrid vehicles, depending on the level of energy efficiency.

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