

Research on the factors affecting the cognition of new energy vehicles by Chinese consumers

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Abstract: China has become the world's largest producer and consumer of new energy vehicles. In 2023, the production and sales of new energy vehicles in China reached 9.587 million and 9.495 million units, respectively, with a market share of 31.6%. Exports amounted to 1.203 million vehicles, marking a year-on-year increase of 77.2%, all of which are record highs. Globally, China's production and sales volume of new energy vehicles has been the highest for nine consecutive years, accounting for 65% of the global market in 2023. With the development of the electric vehicle industry, the Chinese electric vehicle market is gradually expanding. As competition in the market becomes more intense, consumers need to consider more factors to make rational choices. Many manufacturers find it increasingly difficult to produce products that are sufficiently attractive, due to an incomplete understanding of consumer needs. This study explores the latest trends of Chinese consumers in the electric vehicle market, as well as their general consumption and attitudes towards electric vehicles, through a questionnaire survey. The results of this study can serve as a reference for manufacturers to make more reasonable product development plans and produce products that meet consumer needs.

1. Introduction

Over the past few decades, the field of electric vehicles has experienced rapid development and transformation. With more electric vehicles entering the Chinese market and the rapid development of the internet, an increasing number of Chinese consumers have started to pay attention to the technological innovations of electric vehicles, and more electric vehicle brands have also entered the public's view through the internet. Nowadays, consumer behavior in the electric vehicle market is gradually diversifying, making more details and phenomena worthy of study.

This paper summarizes the changes that have occurred in the electric vehicle market in recent years, as well as key issues in the study of consumer motivation in recent years, pointing out the impact of electric vehicle manufacturers' marketing and other external factors on consumers. By summarizing the latest information on consumer behavior and demand in the Chinese electric vehicle market, this study can clarify the Chinese consumers' understanding of new energy vehicles and the main factors influencing their consumption.

This survey research adopted the form of issuing questionnaires to collect data. By inspecting the quality of the questionnaires one by one, this study can ensure the reliability and authenticity of the data for precise analysis. Through the analysis and induction of the questionnaire data, the following main results were

obtained: the main factor attracting consumers to purchase electric vehicles is "low usage cost" rather than "low purchase price," consumers are highly likely to purchase electric vehicles due to environmental awareness, and the actual technological development of electric vehicles may be more advanced than the public's perception, etc.

2. Literature review

In recent years, consumers' willingness to purchase electric vehicles (EVs) has undergone significant changes. Against this backdrop, micro-level research focusing on consumers' purchase intentions and behaviors has become increasingly rich. When the first electric vehicle entered the Chinese market, consumers' understanding of EVs was likely limited to reducing urban pollution and low-carbon travel. Most consumers also consider utility issues when purchasing electric vehicles in their daily lives[1]. Perceived value directly impacts consumers' purchasing behavior[2], and perceived value includes dimensions such as social value, emotional value, and functional value[3].

From internal factors, consumers view electric vehicles as sustainable energy products, and their purchase intentions are influenced by perceived risks, perceived costs, and perceived benefits[4]. Perceived economic benefits, perceived environmental benefits, and perceived risks are interconnected and can explain and

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predict people's attitudes toward purchasing electric vehicles[5]. From external factors, social norms and policy environments significantly impact purchasing behavior[6]. Most studies indicate that the more comprehensive the favorable policies for new energy vehicles, the higher the perceived value among potential consumers[7].

However, in today's increasingly developed internet age, many consumers are influenced by influencers and bloggers, and the overwhelming publicity makes consumers overlook many potential issues[8]. Many consumers do not fully understand the working principles and technological maturity of electric vehicles when purchasing them, leading to irrational choices and post-purchase regrets. If consumers feel uncomfortable with EV technology or do not see enough EVs around them, it will affect their willingness to purchase EVs[9]. Moreover, issues such as the lack of safety, insufficient after-sales service outlets, high maintenance costs, and inconvenient energy supply for new energy vehicles are also the main reasons why consumers' purchase intentions do not translate into actual purchasing behavior[10]. In summary, different consumers have different considerations when choosing to purchase electric vehicles. This paper aims to explore the factors driving consumers to purchase electric vehicles from their perspectives, hoping to provide valuable insights for the development of the electric vehicle market.

3. Experiment

3.1. Experimental design

This survey on electric vehicle (EV) consumption was conducted through the distribution of questionnaires, resulting in a total of 286 valid responses. Among them, 31.47% of the respondents were aged 46-55, which is the largest group, and the ratio of male to female respondents was approximately 1:1.

3.2. Core issue

The main focus of the study is on the following issues: (1) As consumers have more abundant information sources compared to the past, the reasons for consuming electric vehicles have also become more diverse. This survey will explore whether consumers will make more rational choices due to abundant information sources. (2) Through the questionnaire data, understand the impact of marketing methods such as "planting grass and soft advertising" on consumer choices, and analyze whether the general consumer will make regretful choices due to lack of purchase experience and professional knowledge. (3) Through this survey, obtain information about the changes in consumers' motivation for consuming electric vehicles and analyze the reasons. (4) By analyzing the questionnaire data, understand the product features that consumers focus on. (5) By analyzing consumers' preferences and needs for electric vehicle products, explore how electric vehicle manufacturers should adjust their production planning to fully meet distribution

efficiency.

4. Result

4.1. Cost preference

Research data shows that 20.98% of respondents have already purchased electric vehicles, with 88.34% of these respondents spending between 50 to 300 yuan per month on energy costs. Meanwhile, among those who own or plan to purchase electric vehicles, 61.17% chose to buy because "electricity is cheaper than gasoline." In this survey, only 37.86% of consumers chose to buy electric vehicles because of their higher cost-effectiveness. To further explore this issue, the survey included the question, "How attractive is the price difference between electric vehicles and fuel vehicles?" Among the respondents, 24.27% indicated that price is not the main source of attraction. Notably, in the question "I believe the operating cost of electric vehicles is very low," we found that regardless of whether they have purchased, plan to purchase, or never plan to purchase electric vehicles, respondents generally believe that the operating cost of electric vehicles is very low. Those who rated this belief at levels 3 to 5 on the scale accounted for 71.33% of the total respondents.

4.2. Demand preference

Research data shows that 20.98% of consumers have purchased electric vehicles, with 53.33% of them choosing models priced between 100,000 to 300,000 yuan, while only about 5% opted for models priced above 500,000 yuan. Meanwhile, 36.01% of consumers who have not yet purchased but intend to buy electric vehicles have a budget of 100,000 to 300,000 yuan, with only 3% having a budget above 500,000 yuan. Additionally, 47.56% of respondents have an income level between 100,000 to 400,000 yuan, making it difficult for most consumers to afford electric vehicles priced above 300,000 yuan. Many consumers also believe that the quality and technology of electric vehicles on the market do not justify the high prices. Among those who have never considered purchasing an electric vehicle, 30% think that electric vehicles are prone to accidents due to quality issues, 47.97% believe that the technology of electric vehicles is not yet mature, and 65.39% frequently see news about electric vehicle accidents.

4.3. Environmental preference

Research data shows that among consumers who have already purchased or intend to purchase electric vehicles, 62.14% believe that the main reason for their purchase is the low-carbon and environmentally friendly nature of electric vehicles. Additionally, 51.05% of consumers consider energy conservation and emission reduction, as well as reducing air pollution, to be very important, rating it as a level 5 on the scale question. Furthermore,

44.06% of consumers believe that electric vehicles are a highly eco-friendly mode of transportation. The survey results show that 17.48% of respondents are willing to purchase electric vehicles because their colleagues, friends, or family members use them; 31.47% believe it is easy to find charging stations or charging piles in their city; and 41.96% of consumers frequently see advertisements for electric vehicles. This exposure likely informs them of the environmental advantages of electric vehicles, making them a preferred choice for consumers.

4.4. Regret the purchase

Research data shows that many consumers regret purchasing electric vehicles due to poor preservation and limited range. Among the respondents, 20.98% have purchased electric vehicles, and approximately 12% regret their decision. Of those who regret, 43.33% cite poor preservation of the vehicle as the reason, and 40% attribute their regret to inadequate range. Among respondents who have not purchased and have no intention to purchase electric vehicles, 47.97% believe that the technology is still immature. In contrast, only 18.33% of those who have purchased electric vehicles share this belief. Regarding electric vehicle marketing, 41.96% of consumers report frequently seeing advertisements for electric vehicles, indicating a high likelihood that consumers are informed about the latest technological innovations through ads. However, 17.83% of consumers find the marketing of electric vehicle brands excessive and annoying, which may contribute to the distrust in electric vehicle technology among consumers.

5. Findings and discussions

5.1. Cost reasons

Consumers primarily value the low operating costs of electric vehicles (EVs) rather than their low purchase price. Firstly, the energy expenses of EVs in daily use are significantly lower than those of fuel-powered cars, allowing consumers to save substantial amounts over long-term use. Many consumers find that their monthly energy expenditure for EVs is much lower than for fuel-powered cars, which drastically reduces the overall cost of ownership. This long-term economic advantage makes EVs more appealing in actual use, despite their potentially higher initial purchase price.

Furthermore, many consumers choose EVs because "electricity is cheaper than fuel." This highlights the advantage of EVs in terms of energy costs. As fuel prices fluctuate and rise, the stable and low electricity costs make EVs a more cost-effective choice. Consumers generally believe that the operating cost advantage of EVs outweighs the disadvantage of their purchase price. Additionally, more and more consumers recognize that EVs not only reduce energy expenses but also come with various government subsidies and incentives. These policies further lower the usage cost of EVs, making them more economically attractive.

In conclusion, the main reason consumers purchase EVs is their low operating cost, not the low purchase price. The economic advantages of EVs over the long term, stable energy costs, and supportive government policies make them an important consideration for consumers when choosing a vehicle. Low operating costs are the key factor attracting consumers to EVs, reflecting a preference for long-term economic benefits over short-term purchase costs.

5.2. Demand reasons

Consumers' demand for high-end, expensive electric car models is relatively low in China. Most consumers prefer mid to low-priced electric vehicles. This preference can be analyzed from several perspectives:

Firstly, consumers' own income limitations are a crucial factor. The income levels of most consumers determine their budget range when purchasing a vehicle. Despite the lower long-term operating costs of electric cars, their initial purchase prices are generally higher, making it difficult for lower-income consumers to afford them. Consequently, these consumers tend to favor relatively lower-priced gasoline vehicles, even though the long-term usage costs of gasoline cars may be higher.

Secondly, consumers who already own gasoline cars may have relatively limited expectations regarding the quality of electric vehicles. Many consumers consider the maturity of electric vehicle technology and its stability in terms of quality when choosing electric cars. Since electric vehicles represent newer technology, some consumers may have doubts about their quality and reliability, especially those who are accustomed to and satisfied with their gasoline cars. They may prefer to continue using familiar gasoline cars rather than risking trying new technology.

Thirdly, some consumers are unwilling to pay higher prices for electric cars because they enjoy the comfort and experience that gasoline cars provide. After years of development and improvement, gasoline cars have reached higher levels in terms of driving experience, comfort, and performance. Many consumers are highly satisfied with the driving experience of gasoline cars and are skeptical about whether electric cars can provide an equivalent or better experience. Therefore, these consumers are more inclined to continue using gasoline cars rather than spending more on electric cars.

5.3. Environmental reasons

Many Chinese consumers choose to purchase electric vehicles primarily due to their environmental awareness and concern. The prevalence of environmental consciousness among consumers can be attributed to various influences and factors.

Firstly, there is a phenomenon known as the herd effect in society, where consumers who already own electric vehicles may influence their friends and family to choose this environmentally friendly mode of transportation. This interpersonal influence helps to propagate and strengthen environmental awareness

through personal experiences and close relationships.

Secondly, public service advertisements play a crucial role in promoting the concept of energy conservation and emissions reduction. These advertisements often highlight the advantages of electric vehicles in reducing urban air pollution and promoting environmentally friendly transportation. Consumers may gain information about the environmental benefits of electric vehicles from these advertisements, thereby stimulating their environmental consciousness and influencing their decision to purchase electric cars.

The government has also played a significant role in promoting the widespread adoption of electric vehicles, particularly through the construction of more charging stations and the implementation of supportive policies. These measures not only facilitate consumer access to electric vehicles but also promote the implementation and popularization of green transportation.

Furthermore, electric vehicle manufacturers emphasize the "energy-saving and environmental protection" features of their products in their marketing efforts. By enhancing the environmental image and technological advantages of their products, manufacturers attract consumer attention and increase their motivation to purchase electric vehicles.

5.4. Regret the reason

Many consumers adopt a cautious approach towards purchasing electric vehicles, driven by several key considerations. Firstly, the issue of resale value significantly impacts their decision-making. Due to the relative youth of many electric vehicle brands and their limited brand recognition, these vehicles often exhibit lower depreciation rates in the secondary market. Consumers fear that shortly after purchase, the resale value of their vehicles will significantly decline, leading them to approach investing in electric vehicles with caution.

Secondly, the high depreciation rate of electric vehicles also influences consumer purchasing decisions. Compared to traditional gasoline vehicles, the rapid advancement in electric vehicle technology and battery performance can quickly render current models outdated, reducing their competitiveness in the second-hand market. Consumers are concerned that future upgrades in electric vehicle technology may soon render their purchased models obsolete, thereby affecting market prices and sales potential for used electric vehicles.

Moreover, limitations in long-distance travel capabilities present another deterrent for consumers. While electric vehicles perform well in short-distance urban driving, their reliance on battery storage capacity and the availability of charging infrastructure raise doubts among consumers regarding their reliability and convenience for long-distance journeys. This limitation often steers some consumers towards traditional gasoline vehicles, which offer distinct advantages in long-distance travel and refueling convenience.

Lastly, excessive marketing practices contribute to consumer skepticism towards electric vehicle technology.

Despite continuous advancements in electric vehicle technology, some consumers perceive exaggerated or unsubstantiated claims about the advantages of electric vehicles in the market, which leads to doubts about their technological maturity and reliability. This lack of trust hinders widespread consumer adoption and acceptance of electric vehicles.

6. Conclusion and suggestion

6.1. Conclusion

This study employed a questionnaire survey method to analyze the potential factors influencing Chinese consumers' consumption of electric vehicles. By analyzing consumer attitudes and behaviors, the study explored the limitations and advantages and disadvantages of the Chinese electric vehicle market. The results indicate that many Chinese consumers choose to purchase electric vehicles because their operating costs are lower than those of fuel vehicles, and the lower energy expenses are more attractive to Chinese consumers than lower purchase prices. At the same time, due to reasons such as herd effect, government public welfare advertisements and promotion, and electric vehicle brand marketing, Chinese consumers have a core environmental concept, leading them to choose electric vehicles. Moreover, there are significant limitations to the consumption of high-end electric vehicles in China. Due to income constraints, the existence of substitutes, and limited technology, only a small portion of Chinese consumers are willing and able to pay a high price for electric vehicles. In addition, the development of electric vehicle technology is still not widely recognized. Due to excessive brand marketing or negative news, many consumers who have not yet consumed electric vehicles are more skeptical about electric vehicle technology than those who have already purchased electric vehicles. Furthermore, consumers who have purchased electric vehicles may regret it due to the low retention rate or poor endurance capability of electric vehicles.

6.2. Suggestion

The purpose of this survey research is to analyze the main motivations and possible objective or subjective influencing factors of Chinese consumers' consumption of electric vehicles. The conclusions of the questionnaire survey are based on consumers' attitudes towards electric vehicles in real life, and the analysis results can be used as a reference for the future development direction of electric vehicle brands. When electric vehicle manufacturers understand the current attitudes of Chinese consumers towards electric vehicles, brands can achieve higher distribution efficiency by meeting the needs of more consumers. Based on consumer feedback expressing annoyance with marketing, manufacturers can optimize their marketing strategies according to the current attitudes of consumers, thereby effectively improving consumer recognition of electric vehicle technology. Moreover, electric vehicle manufacturers can

also refer to the factors that lead consumers to regret purchasing electric vehicles, and improve product quality through the development of new technologies to prevent more buyers from being disappointed with electric vehicles. At the same time, electric vehicle producers can promote higher demand for high-end electric vehicles in the Chinese electric vehicle market through more effective marketing strategies. In summary, the results of this survey can be used as a reference for electric vehicle brands to formulate business plans based on consumer behavior trends.

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