

The Dynamics of Consumer Preference in Electric and Fuel Vehicle Industries

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Abstract. The new energy vehicle market is growing rapidly, with continuous technological innovation and increased policy support. This study investigates the influence of market education on consumer preferences between electric vehicles (EVs) and internal combustion engine (ICE) vehicles. It investigates the impact of market education, which includes advertising, professional forums, and social media platforms, on consumer decision-making. The research reveals that market education significantly enhances consumer understanding of EV technology, builds brand trust, and stimulates purchase intentions. Celebrity endorsements and social media campaigns have been particularly effective in the short term, while professional forums have deepened consumer trust in EV technology. Market education has also played a critical role in highlighting the long-term cost-effectiveness of EVs, helping to overcome the hurdle of high initial costs. The study concludes by suggesting that automobile manufacturers and policymakers leverage market education to address consumer concerns about EVs and foster the development of the EV market.

1 Introduction

The automobile industry has reached a critical crossroads because consumers now have a significant choice between conventional vehicles powered by internal combustion engines (ICE) and electric vehicles (EVs). In comparison to internal combustion engine (ICE) vehicles, electric vehicles (EVs) represent a significant alternative. Developments in battery technology, business-friendly policies, and consumers' growing preference for ecologically friendly modes of transportation are driving this trend. As the market for electric vehicles (EVs) continues to expand, it is becoming increasingly important to gain a deeper understanding of the factors that influence consumer choice between electric vehicles and vehicles powered by internal combustion engines (ICE). This study aims to explore the current landscape of consumer choice preferences, taking into account the impact of market education as well as the shifting dynamics between these two categories of automobiles.

A range of factors, such as environmental concerns, financial considerations, acceptance of technological advancements, and the availability of infrastructure, influence the

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decision-making processes behind the adoption of electric vehicles (EVs) as opposed to fuel-powered cars.

Concerns about the environment: Customers who place a high priority on lowering their carbon footprint are more likely to choose electric vehicles (EVs) because of the lower emissions profile that they have. "Transportation Research Part A: Policy and Practice" published a study revealing consumers' preference for more expensive electric vehicles (EVs). The study also suggested that environmental concerns could play a key part in the decisions that these consumers make [1].

Consumers may receive a variety of financial incentives to encourage them to buy electric vehicles. These include tax exemptions, subsidies, and lower operating expenses. Despite this, the initial cost of electric vehicles continues to be a barrier for certain consumers. The International Energy Agency (IEA) reports that the initial cost of electric vehicles (EVs) often surpasses that of vehicles powered by internal combustion engines (ICE). However, EVs' total cost of ownership (TCO) is becoming more competitive as a result of increased savings on fuel and maintenance costs [2].

Adoption of Technology: Consumers who are early adopters of technology and eager to test new items are more likely to acquire electric vehicles (EVs). The journal "Sustainability" published an investigation that found that perceived consumer effectiveness (PCE), a measurement of how effective consumers believe their actions will be in achieving environmental goals, significantly influences the desire to adopt electric vehicles [3].

Availability of Infrastructure: The availability of charging infrastructure is a crucial aspect in the progression of electric vehicle adoption. The likelihood of consumers opting for electric vehicles is higher in regions that have established charging networks. [2] The International Energy Agency (IEA) report highlights the fact that markets with supporting policies and infrastructure development focus on the rise in electric vehicle sales.

Range and Performance: Concerns about range anxiety and the performance of electric vehicles may lead customers to favor fuel-powered vehicles. In spite of this, electric vehicles are becoming more appealing as a result of developments in battery technology and expanded range possibilities. Consumer preferences can be influenced by factors such as temperature and driving patterns, according to a study that was published in the journal "Environmental Science & Technology" [4]. The study concluded that the emissions implications of electric vehicles (EVs) vary significantly among regions and depend on characteristics such as these.

Brand and Model Availability: The wide range of electric vehicle models and brands that are now on the market can impact the choices that consumers make. In regions where there is a greater variety of electric vehicle models available, such as China and Europe, the adoption rates are higher. As a result of the influence of local market conditions and customer choices, the International Energy Agency's (IEA) research shows that China, Europe, and the United States are responsible for over 95% of the global sales of electric vehicles (EVs) [2].

In summary, a variety of economic, social, and environmental factors influence the complicated decision between electric vehicles (EVs) and fuel-powered cars. Given the ongoing development of the electric car market, understanding consumer preferences and addressing their concerns will be essential in order to increase the number of people who purchase electric vehicles.

This study aims to investigate the influence of market education on customer preferences for electric cars (EVs) versus internal combustion engine (ICE) vehicles. Particularly, it desires to examine the impact of market education, a component that has not been extensively studied in previous research. The project will evaluate the impact of market education tactics, such as advertising, professional forums, and social media

platforms, on consumer decision-making. The study aims to analyze these elements in order to reveal the intricacies of how market education impacts customer preferences. It also aims to provide valuable insights that can inform the creation of successful market education initiatives in the automobile sector.

2 The development of electric vehicles

China presently has the title of being the largest worldwide market for electric cars (EVs), and it plays a crucial role in the development and growth of the EV sector. The nation's dedication to decreasing carbon emissions and its strong industrial strategies have propelled swift expansion in the electric vehicle (EV) market, positioning it as a front runner in the shift towards environmentally friendly transportation.

As of the year 2023, China held the largest share of the global market for electric vehicles (EVs), accounting for over sixty percent of the total sales. When compared to the previous year, China's sales of electric vehicles (EVs) increased by fifty percent in 2022, reaching over six million units [5]. Robust government incentives, including tax exemptions, subsidies for electric vehicle purchases, and investments in charging infrastructure, support the rapid expansion of electric vehicles. China's "dual credit" policy, which requires automobile manufacturers to produce a specific percentage of electric vehicles before they can sell them, has also accelerated the uptake of electric vehicles [6].

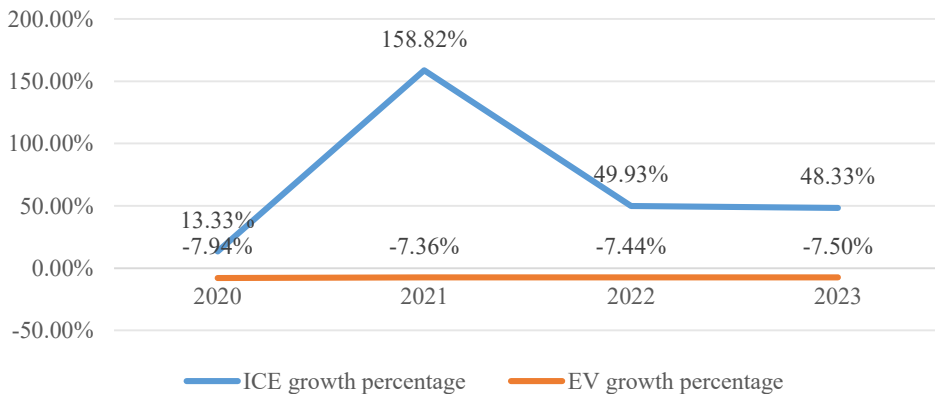


Fig. 1. The percentage increase in electric vehicles and internal combustion engines in China from 2020 to 2023 [7].

To put that into perspective, electric vehicles (EVs) accounted for approximately thirty percent of the total new vehicle sales in China in 2022, which is a huge rise from the five percent that they held in 2016 [8]. Production companies worldwide compete for market share in a fiercely competitive market. BYD and NIO are just two of the Chinese electric vehicle (EV) firms that have emerged as formidable competitors in the industry. When it comes to sales volume, BYD eclipsed Tesla in 2023 to become the most successful electric vehicle manufacturer in the world [9]. Geely and SAIC, two of the most important manufacturers in China, have both made substantial financial commitments to electric vehicles (EVs), which has resulted in an increase in the market's variety as well as its level of competition.

The Chinese government has significantly impacted the electric vehicle (EV) business through its active participation in the process. It was necessary to provide large subsidies and incentives in the beginning stages of the market's development in order to encourage its growth. When the market reaches a more advanced stage, however, the government will gradually reduce subsidies in order to encourage innovation and competition. The

government takes this action to foster economic growth. Despite the cutting of subsidies by more than fifty percent by 2020, the market continued to expand, exhibiting high consumer demand and market resilience [10]. This transformation has led to a shift in the market's influence from the government to the market for electric vehicles (EVs) in China.

China has made significant progress in developing charging infrastructure, an essential component. It is anticipated that China will have installed more than 3.5 million charging points, including both public and private chargers, by the end of 2022. Approximately 75 percent of the world's charging infrastructure is located in this region. The extensive network of charging stations alleviates concerns about restricted driving range and increases the comfort of owning an electric vehicle. As a result, electric vehicles are more widely accepted and used today.

Internal combustion engine (ICE)-powered automobiles have traditionally dominated the Chinese automotive market, with foreign manufacturers holding a significant percentage of the market. Nevertheless, the existence of domestic manufacturers of electric vehicles (EVs) has brought about a significant shift in the market dynamics. In addition to having a sizeable chunk of the domestic market under their control, BYD, NIO, and Xpeng are all making significant efforts to expand their presence in international markets. Consequently, China is transitioning from relying on imported automotive technology to becoming a global leader in the development and production of electric vehicles (EVs).

Since its inception as a fledgling industry that was dependent on government support, the market for electric cars in China has developed into a dynamic and competitive business that has a significant impact on the global community. Due to the continual advancement of technology, the expansion of charging infrastructure, and the strong presence of its domestic brands, China is in an excellent position to continue to maintain its dominant position in the global electric vehicle (EV) sector. This demonstrates China's commitment to sustainable development and its influence on the future of transportation around the world. China's rapid expansion and advancement of electric cars (EVs) are examples of this commitment.

3 Market education analysis of EVs and ICEs

Market education has a significant impact on consumers' purchasing decisions, whether they are considering acquiring a gasoline-powered or electric vehicle. It is of utmost importance to choose a spokesperson from among the multitude of options available in the world of advertising communication. In order to improve the product's market visibility as quickly as possible, an effective spokesperson should have a broad understanding of the product as well as a strong alignment with the brand's image.

An example of this would be the well-known Chinese actress Yang Mi, who has expressed her support for the Xiangjie S9 electric automobile. Within the first three days following the official announcement, this advice led to more than 4,800 pre-orders, and within a week, the total number of orders surpassed 10,000 [11]. The previously supplied sales data suggests that the endorsement effort has yielded significant success in the short term. This phenomenon highlights the importance of choosing a spokesperson and formulating a marketing plan to boost consumer purchase intentions. Yang Mi used a number of different social media channels to share her experiences with the Xiangjie S9 while she was participating in endorsement efforts. Yang Mi encouraged people to discuss and share the product, leading to a boost in the brand's visibility and impact. It achieved this by encouraging people to discuss and share the product. It became more visible and had a greater impact on the brand. The quick dissemination of viral content across various social media platforms exerted a significant influence on this process.

Attending lectures and participating in professional forums are two of the most important aspects of acquiring market education. The customers work together with industry professionals and executives from the organization to acquire a full understanding of the products and trends that are prevalent in the sector. The China Electric Vehicle Hundred Persons Forum serves as a notable example of how to effectively raise public awareness of electric vehicles by disseminating cutting-edge technological achievements. This forum enables consumers to make more educated decisions when purchasing electric vehicles, which is a significant benefit.

Marketers have the opportunity to directly communicate with customers through social media platforms like Xiaohongshu (Little Red Book) and a number of other platforms. The platform's user base, primarily young urbanites who prioritize maintaining a high quality of life, fosters an environment that is ideal for the targeted marketing of electric car companies. Brands have the ability to collect feedback and enhance their products and services by connecting with consumers, which eventually leads to greater levels of customer happiness and patronage at the end of the day.

For instance, Dongchedi, also known as "Car Guru," is a platform that provides extensive information, transactions, and services related to automobiles. The intention is to provide customers with authentic and knowledgeable automotive content, as well as convenient and dependable car-choosing services. Dongchedi's users are part of a large community of content creators and vehicle enthusiasts. In order to respond to the distinct and individualized interests of its users, Dongchedi offers a wide variety of material types, including graphics, videos, and live broadcasts. By doing so, Dongchedi is able to fulfill the requirements of its users. Using a comprehensive service chain that includes "car selection" and "car purchase," the platform positions itself to aid users in accessing content that is relevant to vehicle models, getting "endorsement," and securing their intentions to purchase a car. The platform accomplishes this by enabling users to select and buy cars. In addition to working in conjunction with marketing campaigns, the objective of this strategy is to achieve a substantial conversion rate.

The market education for the internal combustion engine (ICE) car market places an emphasis on the advantages of a technology that has been available for a long time, a huge network of fueling stations, and the ability to purchase these vehicles without having to go through any delays during the process. Strategic marketing campaigns typically highlight reliability, efficiency, and the convenience of recharging at a broad network of gas stations for automobiles powered by internal combustion engines (ICE). Businesses also provide customers with financial incentives in the form of competitive pricing, a variety of financing options, and trade-in programs in order to entice them to make purchases. The purpose of interactive events, which include test drives and question-and-answer sessions, is to provide prospective purchasers the opportunity to instantly interact with the units in order to increase their level of confidence in the technology of internal combustion engines (ICE). The government develops these instructional efforts to increase the conventional appeal and usability of internal combustion engine (ICE) vehicles in order to guarantee that ICE vehicles will continue to be competitive in the continually expanding automotive sector.

Market education has a significant impact on consumers' preferences for electric cars (EVs) and vehicles powered by internal combustion engines (ICE). When it comes to educating consumers on the technological and environmental benefits of electric vehicles (EVs), many techniques have been shown to help improve consumer trust in the brand. Some of these strategies include celebrity endorsements, participation in professional forums, and involvement in social media. Conversely, conventional automobiles powered by internal combustion engines (ICE) enjoy an advantage due to the availability of

numerous gasoline stations and educational programs that highlight their dependability and performance.

The method takes advantage of the fact that customers are already familiar with a technology that has been around for a while. Several additional elements contribute to the attractiveness of automobiles powered by internal combustion engines (ICE), such as monetary incentives and activities that are intriguing to take part in. The purpose of these intensive market education initiatives is to address the concerns of consumers, cultivate brand loyalty, and encourage shoppers to make well-informed purchasing decisions. This is true whether the vehicles in question are conventional cars powered by internal combustion engines or cutting-edge electric automobiles. This understanding is critical for the development of efficient market education methods that connect with customers and influence their purchasing decisions.

4 Conclusion

This paper examines how market education influences consumer preference between electric vehicles (EVs) and internal combustion engine (ICE) vehicles, with a particular emphasis on how educational levels affect consumer decision-making. Through a comprehensive analysis of various facets of market education, including the impact of celebrity endorsements, professional forums, and social media platforms, this study has uncovered the collective influence of these elements on consumer perception and purchasing behavior.

The findings indicate that market education campaigns have significantly improved consumer understanding of EV technology, bolstered brand trust, and stimulated purchase intentions through a sense of community engagement. Notably, the choice of spokespersons and the viral spread via social media have had a positive impact on sales in the short term. Professional forums and lectures have provided consumers with opportunities to delve into product and industry trends, thereby enhancing their trust in EV technology. Furthermore, market education has been instrumental in raising awareness of the long-term cost-effectiveness of EVs, which is crucial for overcoming the primary hurdle of high initial purchase costs.

This paper endorses the adoption of market education strategies within the automotive sector and paves the way for subsequent research initiatives. With the ongoing advancements in technology and the maturation of the market, it is imperative that market education strategies be further refined to ensure their adaptability and effectiveness across various cultural and economic contexts. Future research should consider addressing specific consumer concerns about EVs through market education, such as demonstrating the performance and economic benefits of EVs in various usage scenarios through empirical studies. Additionally, with the growing global focus on reducing carbon emissions and achieving sustainable development goals, future research on EV market education should also examine the effects of policy changes on consumer behavior.

This paper recommends that automobile manufacturers and policymakers consider leveraging market education initiatives to alleviate consumer apprehensions regarding EVs, such as range anxiety and charging convenience. Moreover, there is a need for further exploration into emerging market education tools and platforms, including mobile applications, online virtual test drives, and interactive experiences, which could potentially influence consumer decision-making. Ultimately, research on market education should aim to provide strategic recommendations to assist automobile manufacturers and policymakers in utilizing market education tools more effectively, thus fostering the healthy development of the EV market and enhancing consumer welfare.

References

1. K. M. Buhmann, J. R. Criado, Consumers' preferences for electric vehicles: The role of status and reputation. *Transportation research part D: transport and environment*. **114**, 103530 (2023)
2. IEAGlobal EV Outlook 2024, IEA, Paris (2024)
<https://www.iea.org/reports/global-ev-outlook-2024>, Licence: CC BY 4.0
3. X. He, Y. Hu, The decision-making processes for consumer electric vehicle adoption based on a goal-directed behavior model. *World Electric Vehicle Journal*. **15**, 386 (2024)
4. M. Singh, T. Yuksel, J.J.Michalek, et al. Ensuring greenhouse gas reductions from electric vehicles compared to hybrid gasoline vehicles requires a cleaner U.S. electricity grid. *Sci Rep*. **14**, 1639 (2024).
5. China Association of Automobile Manufacturers (CAAM). 2023 China New Energy Vehicle Market Report (2023) <http://www.caam.org.cn/tjsj>
6. BloombergNEF. Electric Vehicle Outlook 2023. (2023)
<https://about.bnef.com/electric-vehicle-outlook/>
7. China Association of Automobile Manufacturers. (2024). <http://www.caam.org.cn/tjsj>
8. BYD Co., Ltd. 2023 Annual Report. (2023)
<https://www.bydglobal.com/sitesresources/common/tools/generic/web/viewer.html?file=%2Fsites%2FSatellite%2FBYD%20PDF%20Viewer%3Fblobcol%3Durldata%26blobheader%3Dapplication%252Fpdf%26blobkey%3Did%26blobtable%3DMungoBlobs%26blobwhere%3D1638928466193%26ssbinary%3Dtrue>
9. BloombergNEF. Battery Price Survey 2023 (2023).
<https://about.bnef.com/blog/lithium-ion-battery-pack-prices-hit-record-low-of-139-kwh>
10. U.S. Energy Information Administration (EIA). (2023). <https://www.eia.gov>
11. SOHU. The future of China's home appliance market: Opportunities and challenges (2004). https://www.sohu.com/a/801295445_122001004