

Analysis of Factors Affecting Chinese Consumers' Purchase of New Energy Electric Vehicles

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Abstract: According to the public data of each country, the production and sales of electric vehicles have grown rapidly, especially after 2018. As for China, in 2014 the government polished some policies to let pure electric vehicles appear on the market as a commodity, and now China has the biggest potential market for electric vehicles. Therefore, this article aims to explore the causal factors that may influence the willingness of Chinese people to buy electric vehicles based on existing literature and data. Case comparison and analysis were chosen as the research methods. This study analyzed the sales data and prices of two chief electric car brands: Tesla and BYD, all around the world in 2021 and 2022. The results of the data analysis show that the factors influencing Chinese consumers to purchase new energy electric vehicles include basic factors such as price and sales. In addition, national policy support is also at play.

Keywords: China, electric vehicle, consumption, factors, case comparison

1. Introduction

Currently, the electric vehicle market is rapidly growing since the new concept has been accepted by most residents all around the world. The global sales of electric vehicles will reach 6.75 million in 2021. This figure is 108% higher than that in 2020. These sales include passenger cars, light trucks and light commercial vehicles [1]. Sales of electric vehicles overtook those of cars worldwide in 2021, rising 26% from the previous year. Despite COVID-19 limitations and component shortages, 6.4 million electric vehicle (EV) units will be marketed globally this year. China, which doubled sales in 2020, is the world leader in EV adoption, accounting for 12% of all new electric car sales in 2021 [2]. First, there is a consensus or accords about environments made by countries and many kinds of institutions that reducing carbon emissions, driven by climate change mitigation motives, continues to be a prime environmental challenge faced by global economies [3]. Under this condition, take actions than speak louder. Many countries have polished policies to guide people to purchase EVs. Major fiscal incentives stimulated the initial adoption of electric light vehicles and supported the expansion of the electric vehicle manufacturing and battery industry. The dependence on fossil fuels in the majority of the world's nations causes their economic growth to be unstable (oil, gas, and coal). After all, it is evident that the environment is badly impacted by the irrational use of natural resources [4]. Renewable energy plays a critical role in guaranteeing energy security and solving the difficulties associated with climate change, according to research on the relationship between energy and

economic growth [5]. The return of electric vehicles to the market may be the result of the above reasons. Excepting the reasons above, EVs self have several advantages over conventional gasoline-fueled vehicles (CGFVs), such as being cheaper to drive, environmentally friendly , and better for energy security [6, 7, 8]. According to the data in 2022, the best-selling brands of electric cars are still BYD and Tesla, as the most popular models are the Tesla Model Y and Tesla Model 3. Now, the new energy vehicle market is dominated by BYD and Tesla. Back to this article, it' s talking about the main reasons that may contribute to the high sales of electric vehicles in China, and case comparison and analysis were chosen as the research method. This article may provide some enterprises and their management staff with strategies to adapt to the Chinese consumer' s expectations, for those who want to enlarge the Chinese EV market. What' s more, the article could also provide society with a new perspective to think about economic concepts with a new industry development.

2. Literature Review

There are a bunch of studies that have been conducted to explore the factors that may influence consumers' willingness to buy EVs. Most investigate macro business policies from an industry perspective, for example by discussing the impact of current new energy vehicle policies on time, energy consumption and tailpipe costs to estimate the economic cost of new energy vehicles [9]. Bernstein et al. analyzed the relevant data from 1999 to 2006 in more than 20 cities in the United States and concluded that the fuel price of traditional cars was higher than the fuel cost of hybrid cars and the lack of government subsidies made consumers switch to hybrid cars [9]. Jonn Axsen and Kenneth SKurani investigated and studied the consumption market of Kunhe motor vehicles, and found that the purchase behavior is determined after considering whether the car purchase is economical, whether the car purchase technology is satisfactory, and other factors [10]. Ozaki et al. believe that economic factors are the key factors affecting consumption willingness. Government subsidies for hybrid electric vehicles have greatly promoted consumption [11]. This article, inspired by the conclusions from other subjects and combining economic principles, has a detailed product series and price comparison, taking the specific main products as the starting point for analysis.

3. Distinction between Tesla and BYD in Price

Tesla is a name brand in the new energy vehicle industry, which is the first company in the world to have great usage of auto pilot in reality. It is also a good formula to improve the innovation level of the automobile industry. Creating a new era of electric vehicles is the focus of the company, which is emphasized in its mission and vision. It also believes that electric vehicles are more reliable, efficient and sustainable. They also called themselves the safest new energy vehicles and were famous for both their safety and autopilot. BYD, a high-tech business founded in February 1995, is committed to utilizing technical advancements for a better way of living. After more than 27 years of rapid expansion, BYD has built more than 30 industrial parks on six continents and made important contributions to the rail transit, electronics, automotive, and renewable energy sectors. BYD provides comprehensive new energy solutions with zero-emission, with an emphasis on energy collection, storage, and application. The Dynasty series is the 1.0 product of the rising era of BYD. At present, it has five families of Han, Tang, Yuan, Song, and Qin, including DM and EV models, and only some models of the series.

3.1. The Important Role of Price in Influencing Demand for Commodities

From the basic economic principles, it's clear that the demand for a commodity is mainly influenced

by the price and other factors, like tastes and preferences of the consumers, income of the consumers, changes in prices of the related goods and so on. Here we have a consumption that only the price has variations and other conditions are the same.

Here is the prices of the two most popular types in Tesla and BYD, Model Y and plug-in hybrid Qin Plus DM in 2022. For Tesla Model Y, the basic type is ¥316900, nearly about \$45538.53; for long range type is ¥394900, nearly \$56747.13; for performance type is ¥417900, nearly about \$60052.23. But if consume it in USA online, it only has long range type and performance type, respectively is \$65990 and \$69990. From above it's clear that the Tesla has different price policy in China and USA, and in China, people may cost less if who want to buy the long range type or performance type of Model Y. As far as we look at the price of the plug-in hybrid Qin Plus DM, \$24853 in the USA, and 105800-145800 in China, nearly about \$15192.88 to \$20936.88. From the data, it's obvious that the price in China is still much less than the price in the USA.

Next, it's about the potential market and the consumption market in China and the USA. China's new energy vehicle market completed 2.6 million retail sales in the first half of 2022, an increase of 120% year over year. China had 10.01 million new energy vehicles at the end of June 2022, 8.104 million of which were pure electric vehicles, making up 81% of the total. In terms of penetration, China's NEVs rose from 7 percent in 2020 to 26.7 percent in July 2022, accounting for more than a quarter of the auto market [12]. As for the USA market, people predicted it could reach 670,000 in 2022 in the previous forecast [13]. Obviously, China has a much larger market than the USA.

3.2. The Price of the Series' Goods Influencing the Demand of a Commodity

Some people may be confused about why the USA does not have the basic type of Model Y, but actually, China does not have the long range type of Model 3 either. Maybe we could get some as we looked it over. It is said that the long battery life of Model 3, Model 3P (performance type), Model Y and Model YP (performance type) are all LG batteries, and only the standard Model 3 continues to use the battery of Ningde Era, which is still new in battery industry although it's now plays an important role in the whole world now. The most powerful reason, however, is that Tesla's total production and price were as follows: 249900 for the Model 3 basic type; 339900 for the Model 3 Performance type and Model Y long range type; and 369900 for the Model Y Performance type. From the related website, we could find the Model 3 long range type wasn't register in China, which means the Model 3 long range type didn't even go to the relevant department to apply for a car purchase tax exemption.

As we make an assumption that the Model 3 long range type could be sold in China, we could infer that the price may be about 279900 to 309900 according to the prices of other types. Comparing this with the price of Model Y long range type, 339900, seems unreasonable, as the only distinction between the basic type and the long range type is the battery, which is worth 30000, which is too expensive to have a battery in China, which also means consumers may feel unfair if they see the distinctions between these two types and easily fall into regretful or entangled emotions, which is not good news for the company. Besides, Tesla may also want to take this time to consider the distinction between the two battery brand: LG and Ningde Era to choose the fittest one. In the context, we could have a conclusion that the price of the same series could also influence the demand of a commodity.

4. Distinction between Tesla and BYD in Sales

The position of a brand also has an impact on commodity sales, which should be in line with the consumer's aims. If the production of this brand is mainly for the luxury class, then consumers may have strong stereotypes of this brand and have a higher willing to pay price. If the company has a

lower or higher price than that, it may have a great impact on the sales, which has a stronger impact when the distinctions between the willing to pay price and the real price are bigger than thought.

For Tesla, most people describe it as an expensive and luxury commodity in EVs, and their consumers are principally affluent, which fits with the imagination. Tesla's consumer market is mainly established by families with children. Most of these consumers are professionals, executives or other high-income positions. This is from the perspective of family structure. Furthermore, most Tesla owners intend to keep their Tesla vehicles for many years. Tesla CEO Elon Musk has expressed a preference for investing in better quality cars and improving the customer experience than putting money and revenue into commercials or marketing. This is something he has expressed in various interviews and tweets [14]. In addition, Tesla tried to express a kind of lifestyle and new concepts, but not only a commodity, which could easily attract more people, which means a trend and something new for most people. Innovation has become the most attractive point of a commodity, as Tesla is really famous for its Autopilot assisted driving system. Before that, it's nearly a blank in history.

For BYD, according to relevant data, it took a super different idea in production and determined consumers: at first, although it has many more models of cars, whatever their price or style, it is still not clear: like the Dynasty series, the maximum price distinction between them is approximately 10,000 RMB, or nearly 13,800 dollars. From the target customers and production segmentation perspective, it's really confusing, for if people want to buy a luxury brand, BYD is not a great choice, for it tries to win all customers' preference. But if people want to have a convenient and cheap car, the price of BYD is still not attractive. After the adjustment in strategy, BYD, with its flagship models such as the Tang and Han from the Dynasty series mentioned above, has managed to tap into the mid-to-high end consumer base, most of whom like to play with cars but don't want to splash out on luxury high-performance cars. The data wasn't really optimistic during the first and second seasons of 2021, only like 29295 per month on average. But after BYD launched new models in the Dynasty series in August 2021, the sales averaged out at 81980 per month on average. What's more, according to the survey, the main consumption group is focused on the main classes and a few of the leisure class and young consumers as the main market, so the BYD as an independent brand from a low-grade route to start gradually to a high-end car market strategy. There are some wealthy owners who really like the BYD brand, such as Cao Dewang, a famous Chinese entrepreneur, who bought a Han some time ago.

5. Discussion

From above, it would be clear that, according to the sales data above, it's necessary for a company to have a different price strategy in different sales areas to gain more attention under the condition that all the functions of these two types of EVs are the same. When the commodities in the same series only have a little distinction in usage, we could make a product strategy to let the consumers pay more attention to one product and overlook the price comparison factor. Whatever BYD or Tesla, it has its own consumer segmentation thinking and a super conclusive strategy to face the consumers, which is a viable option for a company that has many models or is only focused on one specific consumer group. For the contents above, the advertisement and other public opinion are also impacted, for most Chinese people have the habit of researching some comments and comparisons made by the professional staff, and other factors may also include supply, cost, and the material being used, and so on. The research method of this paper mainly adopts the way of case comparison for the main body. This means that the more mathematical modeling research method is not adopted, which means the influence of many affecting factors is not expressed concretely. The future study could be whether BYD's famous battery business has an impact on the sales of its new energy vehicles and use a more reasonable mathematical modeling method to carry out specific discussion. From the data perspective,

it's limit to gain more detail and updated data, the conclusion could not fit the present reality one hundred percent.

6. Conclusion

The article offers some insights on the factors affecting the sales of new energy vehicles in China. The data analysis shows that the factors influencing Chinese consumers to purchase new electric vehicles include basic factors such as price and sales. Furthermore, national policy support is at work. There are limitations that were not thought of. The main limitations are that the influence of political or economic background and the epidemic on the sales data cannot be completely excluded. At the same time, the case in the article is about Tesla and BYD. Both of these two companies have other industries in which they operate, like the battery operation management of BYD and the software commencement of Tesla. These were not detailed due to the limited space. Future research could be about whether the other industries' businesses have an impact on the sales of new energy cars.

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