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The Impact of China's New Energy Development on the Automobile Industry: Take BYD as an Example

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Abstract: In the context of China's vigorous support for the development of new energy vehicles, the new energy automobile industry represented by BYD has developed rapidly, and the purpose of this paper is to study whether new energy vehicles will become the mainstream of the industry in the future against the background of China's new energy development. This article considered the current problems and solutions of new energy vehicle development from the perspectives of politics, profit, and cost and summarized the need for new energy vehicle companies to rationally use policies, reduce production costs by optimizing the supply chain, and, at last, improve product quality to maintain sales profits, which will achieve long-term development in the future and become mainstream in the automotive industry. Although in the short term, traditional fuel vehicles still occupy a certain proportion of the market, they will definitely be replaced by more environmentally friendly and efficient new energy vehicles in the future.

Keywords: new energy, BYD, policy, profits, industry

1. Introduction

1.1. Research Background

Nowadays, the energy crisis has become one of the most important issues for all countries around the world. An energy crisis is the effect on the economy of a lack of energy or a rise in prices. As a large country with the world's second largest energy institute system, China's energy situation is still grim, with problems such as a small proportion of per capita resources, large environmental pollution, and an unstable energy structure, resulting in an urgent need for cleaner, more efficient, and more recycled energy. In September 2020, China made an announcement that the Chinese government will adopt a series of measures, such as promoting the development of new energy sources and limiting the exploitation and use of traditional energy sources, to achieve the 2030 carbon peak and the 2060 carbon neutrality target [1].

Carbon neutrality means that companies offset their carbon dioxide emissions through a variety of means, such as planting trees. Based on this historical background and basic national conditions, encouraging and supporting the development of new energy is an important task for China.

The impact of energy shortages and environmental pollution on sustainable development cannot be ignored. The active development of new energy is conducive not only to the treatment of current

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environmental pollution but also to the preparation for future ecological balance. Among them, the concentrated development of new energy vehicles is possibly one of the most significant methods to resolve the problem. New energies, different from traditional energies in many ways, are gradually being exploited. Compared with traditional energy, new energy mainly has the advantages of being environment-friendly, clean, and efficient, such as solar energy, wind energy, nuclear energy, and so on. Especially in the automotive industry, the use of new energy is widely promoted.

1.2. Research Gap

In China, there are many new energy vehicle brands that have developed rapidly in recent years, and BYD is one of the most prominent. In that case, BYD's growth is in some ways a reflection of the growth level of the new energy industry in China. The best chance for BYD right now is for national and local governments to support new energy vehicles. The Chinese government released the "Energy-saving and New Energy Vehicle Industry Development Plan" in June 2012 to help new energy vehicles obtain better conditions for development. Using policy advantages, BYD has accelerated the promotion process of new energy vehicles, which has made the market much more competitive. So far, BYD has become the representative brand of China's new energy vehicle industry. In 2021, it will have achieved sales of more than 590,000 units, a year-on-year increase of 218% [2]. There are many scholars who have studied BYD as the research object and have studied and explored different aspects, such as Li studied how new energy vehicles can better develop in China [3]. Zhao based on the BYD case researched on the principle and advantages of domestic new energy batteries [4]. Zhang made a research paper on whether BYD can break the monopoly of traditional luxury brands through the new energy market and achieve a new breakthrough in the million-level automobile market [5].

Although there are many articles analyzing how BYD can better develop in the future, the impact of new energy development on the future development of China's automotive industry has rarely been discussed directly.

Due to China's focus on new energy and support, BYD announced in April 2022 that it would stop making fuel vehicles. This made BYD the first major car company in the world to stop making fuel vehicles. Stopping the production of fuel-powered vehicles is a huge challenge for BYD. After all, based on the current situation, fuel-powered vehicles still have irreplaceable advantages such as good power and strong endurance. For China's auto industry, BYD's move is undoubtedly a huge breakthrough, which also raises new questions about whether new energy vehicles will completely replace traditional cars to become the preferred means of transportation for people. The article will carry out a series of analyses and conjectures based on this problem, if the future of China's automotive industry opens the door to a new energy era. On the one hand, BYD and other automobile companies that apply new energy will achieve great development and enhance their international influence. New energy vehicles, on the other hand, will have a positive impact on China's severe environmental pollution, as well as the achievement of carbon peak and carbon neutrality goals.

1.3. Structure of This Paper

Based on BYD's financial report data in the past three years and China's development and support for new energy, The following content will make an analysis of how the improvement of BYD Motors is affected by the rapid promotion of the new energy industry. After that, the impact of BYD's disruption in the production of fuel-efficient vehicles on China's auto industry will also be detailed. Looking to the future, BYD must make good use of China's subsidy policy for new energy vehicles when interrupting the production of fuel vehicles. The main target should be actively promoting the

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progress of new energy batteries and improving their endurance and power. In this way, BYD can better maintain its competitive position.

2. Case Description

BYD's development in new energy vehicles dates back to 2008, when the world's first mass-produced plug-in hybrid model, the F3DM, was launched, which showed that BYD took the lead in commercializing electric vehicles. BYD's overall turnover in 2009 was 39.47 billion yuan, up 47.3% year on year, and the profit was higher than 3.79 billion yuan. With domestic scales as its orientation, BYD sold about 450,000 cars in 2009, a year-on-year growth of 1.7 times, ranking first among independent brand car manufacturers on the mainland. Its F3 model sold about 290,000 cars in the whole year and became the sales champion of a single car model in China that year.

In 2008, under the impact of the economic crisis on the environment, BYD maintained a bright growth trend by entering the field of new energy. In 2022, BYD officially announced that they would stop the production of traditional fuel vehicles, which was a shock to the auto industry. They made this decision not on impulse but based on BYD's current development situation. BYD sold a total of 740,000 vehicles in 2021, of which new energy vehicles exceeded 600,000 units and traditional fuel vehicles accounted for only 1/5, showing a downward trend year by year. Is the production of fuel cars abandoned because BYD's crude production of fuel cars could not bring the company rich profits and market recognition, so it was forced to stop?

However, judging from BYD's financial report data for 2022, BYD's decision is correct. In 2022, BYD's production and sales data were conspicuous, with annual vehicle sales reaching 1.863 million units and production of 1.877 million units, ranking it first in the world in new energy vehicle sales. At the same time, BYD has stepped out of the vicious circle of "high revenue and low profit" as the operating income exceeded 420 billion yuan and the net profit was nearly 16 billion yuan, a year-on-year increase of 425.42% to 458.26%. However, the problem behind this phenomenon can't be ignored: the price of lithium batteries has been skyrocketing. Lithium carbonate, which is the essential material of the batteries, cost only 50,000 yuan per ton at the beginning of 2021. However, in just two years, its price has increased several times, reaching as high as 460,000 yuan per ton [6]. Such a huge increase in the price of raw materials in just two years is shocking.

This change has undoubtedly greatly increased the production cost of the new energy vehicle industry. Nowadays, the traditional fuel vehicle still occupies a dominant position; most of the new energy vehicles are the main cost advantage, using a relatively lower price to attract consumers. The rise of raw material costs has undoubtedly had an adverse impact on the promotion of the whole new energy industry. BYD's electric car momentum is good, but it's also a shocking decision to abandon the production of fuel cars outright. Considering China's automobile industry, in the future, will new energy vehicles completely replace traditional cars to become the preferred means of transportation for people?

3. Analysis on The Problems

3.1. The Issues of Policy

From a political perspective, due to the increasingly serious environmental problems, the government pays more and more attention to the development of an environmentally friendly new energy industry, so as to introduce many policies to encourage the new energy vehicle industry. BYD has also been significantly developed under the support of Chinese government policies; in other words, the introduction of relevant national policies to encourage new energy is an important driving force for BYD's vigorous development of the new energy field, and it is also the future development trend of the entire automotive industry to completely transform into new energy vehicles. Automobile

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manufacturers around the world are actively exploring the path of sustainable development. BYD, one of the largest new energy car makers, has begun phasing out production of fuel-powered vehicles in favor of electric ones.

First of all, previous studies have shown that vehicle exhaust contains a variety of greenhouse gases. These gases block sunlight and ultraviolet rays reflected off the Earth's surface; in this way, the normal loss of heat from the earth has been prevented, so the temperature of the earth is increasing in what is known as the greenhouse effect [7]. Environmental protection is a big challenge facing the world today. With the intensification of global climate change, more and more countries and regions started to realize the importance of environmental issues and take action to lessen the adverse effect on the environment. Cars are one of the main causes of air pollution in cities, one of the sources whose negative impact on the environment is becoming more and more noticeable. Therefore, manufacturers need to take measures to reduce their impact on the environment and thus promote sustainable development.

A change in the policy environment also played a role in BYD halting production of fuel-efficient cars. The Chinese government has been promoting the progress of new energy vehicles and has taken a great number of policy measures to encourage their development. For example, preferential policies such as purchase tax reduction and free license plates for new energy vehicles have been implemented to encourage customers to choose new energy cars. In addition, the government has made some policies to restrict the entry of fuel vehicles into cities and guide people to use new energy vehicles. The implementation of these policies has provided a good opportunity for BYD and other vehicle manufacturers.

3.2. The Issues of profits

From an economic point of view, on the one hand, in 2022, the overall economic situation is gloomy, mainly because of the spread of the epidemic. However, due to BYD's focus on the new energy cars, the industry kept growing faster and faster. On the whole, the new energy vehicle sector has brought considerable profits to the company. Besides, the good quality of the vehicles has also brought goodwill to the company. BD’s popularity has increased both at home and abroad. In terms of sales, BYD has also been soaring throughout the third quarter, with sales of 162,500 vehicles in July, 175,000 units in August, and 201,300 units in September; BYD's sales in the entire third quarter have reached 538,800 vehicles [8].

From January to September 2022, the cumulative sales of new energy vehicles reached 1.18 million units. On the other hand, behind the comprehensive change to new energy cars, BYD is facing the dilemma of a sharp contraction in the fuel vehicle market. In 2021, BYD's sales of fuel vehicles fell to 140,000 units, and its sales were surpassed by those of new energy vehicles for the first time. BYD's fuel vehicle sales continue to decline, and it does not have an advantage in the automotive industry.

There are also disadvantages in core technology and brand awareness. At the same time, there are many brands of fuel vehicles, and it is difficult to make a profit without economies of scale for a single model. In 2022, the Chinese mainland opened a gap with other markets in terms of new energy vehicle sales. Most automakers in China, including BYD, Nio, and Xiaopang, are expanding their NEV offerings in 2022. It can be predicted that new energy vehicles will continue to develop in the future.

3.3. The Issues of Material Cost

BYD's new energy vehicles use lithium-ion batteries. Compared with traditional lead-acid batteries, the cost of lithium-ion batteries is relatively high. In terms of cost, it mainly includes battery materials,

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battery production processes and equipment, battery assembly, and other aspects, of which the cost of battery materials accounts for a relatively high proportion. In addition, it is used in the production of new energy vehicles.

The raw materials of key components such as electric motors and electronic control systems used in BYD's new energy vehicles are mostly high-cost materials such as rare elements, aluminum alloys, and copper, and the procurement and processing costs of these materials are relatively high. In terms of technology, BYD's new energy vehicle technical input costs are also relatively high; the speed at which new energy vehicle technology upgrades is relatively fast; and continuous technological research, development, and innovation are required. What is more, the cost of technology investment is higher than that of traditional fuel vehicles [9]. BYD's has a history of high research and development spending; it is one of the reasons why BYD has occupied a dominant position in all the new energy vehicle brands.

At present, the scale of the new energy vehicle market is relatively small compared with the traditional fuel vehicle market, while BYD's production of new energy vehicles is relatively large, which also leads to greater pressure on BYD in terms of raw material procurement and production costs. The impact of raw material costs on the whole new energy vehicle industry is significant; nearly 30 car enterprises have increased the price of new energy vehicles in their sales, with the price increase generally ranging from 3000 yuan to 20,000 yuan; some individual models increased as much as 30,000 yuan. The cost problem will be the key to a smooth transition to a new energy type.

4. Suggestions

4.1. Rational Utilize Policy

As a leader in the field of new energy vehicles and energy storage, BYD can take the following measures to better develop in line with the policy: first, it can increase research and development investment in new energy vehicles and constantly improve product quality and technical level in order to meet the policy requirements for new energy vehicles. In addition, BYD can also add new energy vehicle production capacity, accelerating the popularization of new energy vehicles.

Meanwhile, the government is seeking a more reasonable and scientific allocation of tax incentives to support enterprises related to the new energy vehicle industry to develop in a more positive direction, and the proportion of tax incentives has rebounded in the three years from 2018 to 2020. The tax incentives have exceeded 100% in three years, and it is close to 200% in 2019, and the excessive proportion of tax incentives means that the country attaches great importance to the development of the new energy vehicle industry, but the side also reflects that BYD's current business situation is still relatively serious in terms of dependence on tax incentives [10].

In order to meet the political support, from 2011 to 2020, BYD's R&D output has been steadily increasing, from 889 patents per year in 2011 to 2,215 patents in 2019 [10]. In 2020, despite the impact of the epidemic, it still obtained 1980 authorized patents. In addition, the amount of patent rights in BYD's intangible assets has also gradually increased, from 730804 thousand yuan in 2011 to 2430943 thousand yuan in a single year in 2019, although it fell slightly in 2020 but still reached 1869208,000 yuan [10]. New energy companies need to rationally plan the use of financial subsidies and tax incentives, but also make maximum rational use of fiscal and taxation policies. By making good use of the supportive policies, the new energy industry will improve the supervision mechanism for the use of financial subsidies and tax incentives, refine the management of financial subsidies and tax refunds, improve their utilization rate, maximize the marginal benefits of the policies, and give full play to their own technological and scale advantages.

In the future, new energy vehicles will gradually reduce their dependence on policy support and rely more on their own innovation ability and product quality to open high-quality development.

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4.2. Maintain Profits

Maintaining the income of new energy vehicles has become a key task for enterprises. In that case, BYD needs to comprehensively improve its product quality, technical level, marketing strategy, supply chain management, customer service level, and other capabilities, continuously meet consumer needs, and enhance brand influence and market competitiveness. In 2022, the competition for new energy vehicles is intensifying, and consumers will not only pay attention to the sense of an intelligent driving experience but also consider brand reputation, comprehensive product performance, and the vehicle delivery cycle.

In order to win the sales competition, for example, the BYD Seal model, which was launched in 2022, is positioned for a young customer group, has both technology and dynamics, has a lower price than competing models, has significant competitive advantages, and has gained cumulative sales of 51,200 units since the launch of this model [11]. At the same time, BYD Seal has reached its sales target of more than 10,000 in a single month for three consecutive months, and in December 2022, this model sold 15,378 units in a single month, becoming a leader in its class at the sales level, which also means that BYD Seal has now become a popular model.

In addition to improving the quality of its own models, it is also necessary to improve customer service levels, actively respond to consumer feedback, improve after-sales service quality, enhance customer stickiness, improve customer satisfaction, and attract more loyal customers.

In this way, the profit growth of BYD and other similar companies will gradually accelerate, and the new energy brand can strive to provide technical services to restore the function of the customer's vehicle, meet the performance requirements, and ensure the normal use of the customer, and continuously strengthen the independent research and development capabilities of enterprises, accelerate research and breakthroughs in core technologies such as new energy vehicles and new energy batteries, and also strengthen the manufacture of key components of new energy vehicles, such as BYD's blade batteries, vehicle endurance, and autonomous driving technology. When the profit growth space of new energy vehicles gradually exceeds that of traditional fuel vehicles, the market may be gradually occupied by new energy vehicles.

4.3. Reduce Cost

Based on the high cost of raw materials for new energy vehicles, supply chain optimization is one of the most important means to reduce the production cost of new energy vehicles. Through the optimization of the supply chain, the coordination of logistics distribution, procurement, and production can be realized so as to improve production efficiency and reduce production costs [12].

The following are several aspects of supply chain optimization to reduce the production cost of new energy vehicles:

First, in the aspect of raw material procurement, the core materials used in new energy vehicles include batteries, motors, control systems, and other components. Supply chain optimization can reduce the procurement cost of these components. The companies can negotiate with their suppliers to get better prices and terms.

Secondly, procurement costs can be reduced by optimizing the supply chain. For example, BYD can establish a long-term cooperative relationship with suppliers and realize bulk procurement to reduce procurement costs. In terms of reducing production costs, the production process of new energy vehicles involves many links, such as body manufacturing, assembly, testing, and so on. By optimizing the production process, production costs can be reduced. For example, production efficiency and product quality can be improved by using automated production lines and intelligent tools, thus reducing production costs.

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In terms of logistics costs, the production of new energy vehicles requires a large number of logistics distributions. Logistics costs can be reduced by optimizing logistics distribution. For example, logistics costs can be reduced by centralizing logistics distribution and optimizing logistics routes. In addition, the adoption of low-carbon logistics methods, such as the use of electric vehicles and lightweight logistics packaging, can also reduce logistics costs.

In the future, supply chain optimization will be one of the most important means of reducing the production cost of new energy vehicles. By optimizing the supply chain, raw material procurement costs, production costs, logistics costs, and after-sales service costs can be reduced. After all the costs have been reduced, more price reduction space for the new energy vehicles is provided. Simultaneously, the production efficiency and competitiveness of enterprises will be promoted, and the popularity and development of new energy vehicles will be encouraged.

5. Conclusion

To sum up, since China announced its carbon peaking policy, it has been continuously increasing its encouragement for the new energy vehicle industry. As a typical representative of China's new energy vehicle industry brand, BYD has greatly promoted the development and popularization of new energy vehicles in China.

In terms of policy, the new energy vehicle companies represented by BYD need to constantly adjust their development strategies to adapt to changes in national policies and gradually reduce their dependence on national support policies. In terms of sales, the proportion of BYD's traditional fuel vehicle sales continues to decline, while the proportion of new energy vehicle sales continues to rise and bring huge profits to BYD.

In the future, BYD needs to increase investment in technology research and development to design more beautiful models and continuously improve the performance of cars to shape its own brand image and consolidate its customers. However, due to the rapid development of new energy, the demand for raw materials is also increasing, so the supply of raw materials is insufficient and the price has risen sharply. In the face of such a situation, new energy vehicles need to optimize the supply chain and achieve scale effects to reduce costs as much as possible and maintain the price advantage of new energy vehicles so as to occupy a dominant position in the competition with traditional energy vehicles. BYD has announced that, as of 2022, it has stopped the production of fuel vehicles and started focusing on the production of new energy vehicles. After making this decision, BYD is still in a good situation of development, and new energy vehicles are getting more popular, which may become the development trend of the entire automotive industry in the future.

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