

Cross-national competition analysis of China's new energy vehicle supply chain in the post-epidemic era: Take BYD as an example

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ABSTRACT

Now that the global epidemic has gradually come to an end, China's new energy vehicles, which have been driven from policy driven to market driven, show a substantial growth trend under the circumstances of the economic slowdown. In domestic tram giant BYD, for example, the analysis of BYD's new energy vehicles on the present situation of the supply chain, put forward the new energy automobile supply chain development and change direction of Suggestions and measures, through SWOT analysis BYD in transnational competition advantages, disadvantages, opportunities and threats, in order to enhance the industrial supply chain independent control ability.

KEYWORDS

New energy vehicles; BYD; Supply chain.

1. BACKGROUND INTRODUCTION

Since the founding of the Republic of China, China has been exploring a fast track of automobile development. The development of new energy vehicles is the national strategy of "overtaking on the curve", and also the main starting point to promote the dual-carbon target. Since 2001, electric cars as a total of 2 billion yuan of research and development funds "863" project one of 12 major projects, formed by pure electric, electric hybrid, shake battery three technical route for the "three vertical", with power battery, drive motor, powertrain control system three kinds of common technology for the "three horizontal" electric vehicle research and development pattern. The chief scientist of new energy vehicles believes that the development of new energy vehicles is an opportunity for the rise of China's automobile industry, China can surpass western countries in this field, and lead China's automobile industry to take the lead in the advanced road of zero-emission technology. At the same time, it is also worth paying attention to the development of batteries. At the beginning of the 21st century, battery technology made breakthroughs, and many countries began to manufacture electric vehicles on a large scale. At this time, more than 200 new energy vehicle enterprises have appeared in China. In 2022, China's new energy vehicles will continue to grow explosively, maintaining the world's first place for eight consecutive years. As of June 4, 2023, the number of new energy vehicles in China has exceeded 15 million, and the sales volume continues to grow.

2. THE CURRENT SITUATION OF NEW ENERGY VEHICLES IN CHINA

2.1. Sales performance

In the first quarter of 2023, BYD's cumulative sales reached 552,000 units, up 92.81% year on year, accounting for 21.1% of the global market. Tesla, which has the world's best-selling Model Y in the first quarter, ranked second, accounting for 16.01% of the global market share, and is a pure platform model. But it is worth mentioning that BYD's sales are mainly from the Chinese market, with the best-selling model is BYD Qin PLUS DM-I, which independently developed super hybrid model for BYD.

Driven by the growth of exports of new energy vehicles, Europe, which actively promotes the process of carbon neutrality, has gradually become the core target market for China's exports. However, the performance of China's new energy vehicles in the foreign market is quite different from the domestic market, and from the results, BYD's sales are close to disappearing. Tesla Model Y has performed well in foreign markets, with impressive sales.

2.2. Fierce competition in the domestic market, and vicious competition and waste of resources appear

In 2022, the domestic and foreign new energy vehicle market has developed rapidly, and the sales volume has showed a substantial growth. However, the prospect of the new energy vehicle market in 2023 is not optimistic, and the overall passenger car sales are expected to achieve zero growth. The growth of the new energy vehicle market has entered a bottleneck stage, facing the problem of sales growth and consumer wait-and-see sentiment. The market competition is fierce, the price war opens, the enterprise profit space is narrowed substantially.

The latest data of China Automobile Power Battery Industry Innovation Alliance shows that in the first five months of this year, China's cumulative power battery loading volume is 119.2GW h, with a cumulative year-on-year growth of 43.5%. In the first five months of this year, the cumulative output of power batteries was 233.5GW h, with a cumulative year-on-year growth of 34.7%. In contrast, in the first five months of this year, power battery production is nearly twice the load volume, and power battery production is much higher than demand.

2.3. Strong competitiveness of the industrial supply chain

It is believed that the supply chain of new energy vehicles is one of the most complex supply chain systems, including the procurement of raw materials, the processing and supporting of parts, the assembly of vehicles, the distribution of vehicles and even after-sales service, which constitute a supply chain with various levels and complex structure.[1]

The upstream of the new energy vehicle industry chain mainly revolves around the "three power". The core part of the new energy car is composed of three parts: battery system and electric control system of motor system.[2] Upstream companies include raw material suppliers such as Ganfeng Lithium and Huayou Cobalt, as well as core component suppliers such as CATL and Broad Ocean Motor. Midstream refers to the manufacturing of new energy vehicles. The manufacturers mainly include domestic enterprises such as BYD and SAIC, new car manufacturing forces such as NIO, Xiaopeng and Li Auto, as well as foreign manufacturers such as Tesla, BMW and Mercedes-Benz. Downstream includes new energy vehicle charging services, new energy vehicle aftermarket service and other application fields. The downstream mainly has SGCC, TELD, Star Charge and other car charging manufacturers.

In recent years, high-tech lithium battery enterprise such as CATL, BYD, Gotion rises rapidly, but the key components of foreign dependency still became the important factors restricting the

development of new energy vehicles to higher quality, especially in the field of represented by IGBT automotive chip, China's technical strength with European and American advanced countries there is a big gap.

3. THROUGH SWOT ANALYSIS, BYD AUTO SUPPLY CHAIN TRANSNATIONAL COMPETITIVENESS

3.1. Advantages (Strengths)

On the one hand, BYD is leading in technology. In battery terms, BYD's own blade battery is superior in terms of energy density and charging speed, giving them a competitive edge in battery technology. In terms of motor, DM-I super hybrid subverts the traditional oil-based design architecture of hybrid technology, electric-based architecture, and electric hybrid architecture with high-power motor drive and large-capacity power battery energy supply and supplemented by engine. In terms of wheel and body control system, BYD has the "YiSifang" four-motor drive technology and "Yunbian-A" intelligent air body control system, which makes the car more advantageous and competitive compared with other manufacturers in driving experience.

BYD, on the other hand, enjoys high brand awareness in the domestic market. As a well-known car brand in China, BYD has established a good reputation and brand image in the domestic market, which provides a foundation for them to build a reputation and competitive advantage in the international market. In addition, BYD controls the entire new energy vehicle supply chain through vertical integration, including everything from battery manufacturing to vehicle production to sales and services. This vertically integrated supply chain can bring advantages in terms of cost and quality, further enhancing their competitiveness.

3.2. Disadvantages (Weakness)

First of all, although BYD has been very successful in the Chinese market, they face certain challenges in the international market due to a lack of brand awareness and recognition. This may lead to some restrictions on the growth of market share in the international market. Second, BYD's new energy vehicle supply chain relies on a number of key core suppliers. If there are supply chain disruptions or some quality problems, this could have a negative impact on their business. Therefore, they need to pay close attention to supply chain risks and find backup suppliers to mitigate this disadvantage.

3.3. Opportunity (Opportunities)

The rapid growth of the electric car market provides a huge opportunity for BYD Auto to further expand its market share. According to the International Energy Agency (IEA), sales of electric vehicles have grown rapidly over the past few years, and are expected to account for more than 30% of global vehicle sales by 2030 (IEA, 2021). As a leading electric vehicle manufacturer in China, BYD Auto can further expand its market share by continuously improving its product quality and technology level to meet consumer demand for electric vehicles.

Belt and Road The promotion of the initiative provides opportunities for BYD Auto to expand into overseas markets. Belt and Road The Initiative is a major strategy proposed by the Chinese government to promote economic cooperation and cultural exchanges among countries along the Belt and Road. BYD Auto can expand its overseas markets and increase its brand awareness and market share by participating in the Belt and Road initiative. BYD, for example, has established production bases in Egypt, Brazil, Chile and other countries, further expanding its overseas market share.

3.4. Threats (Threats)

Fierce competition and protectionist policies in the international market could have an impact on BYD's export business. With the acceleration of globalization, the competition in the international market is becoming more and more fierce. At the same time, some countries have adopted protectionist policies, imposing tariffs and other restrictions on imports, which may affect BYD's export business. For example, the US government has imposed tariffs on Chinese electric vehicle products, which has had a certain impact on BYD's auto export business (CNBC, 2019).

Volatility in raw material prices and unstable supply may affect BYD's production costs and delivery times for its cars. The production of BYD cars needs a lot of raw materials, such as lithium, nickel, cobalt, etc. The price and supply of these raw materials may be affected by a variety of factors, such as market supply and demand relationship, political factors, etc. The fluctuation of raw material prices and unstable supply may affect the production cost and delivery time of BYD cars, thus affecting the profitability and market competitiveness of the enterprise.

The emergence of emerging technologies and new competitors could pose a threat to BYD's market position. With the continuous progress of technology, the emergence of emerging technologies may pose a threat to BYD car's automobile products and technology. For example, autonomous driving technology, intelligent network technology and other hot technologies in the current automotive industry. If BYD fails to timely follow up and respond, it may lose its market competitiveness. In addition, the emergence of new competitors could also pose a threat to BYD Auto's market position. For example, the rise of new electric car makers such as Tesla has already had an impact on traditional automakers (CNN, 2021).

4. BYD AUTO SUPPLY CHAIN AND OTHER TRANSNATIONAL COMPETITION ANALYSIS

As the world's most competitive market for new energy vehicles in China, BYD not only needs to gain a firm foothold in the domestic market, but also needs to actively open up the foreign market.

4.1. Accelerate the construction of infrastructure (self-operated charging stations and service outlets) for new energy vehicles

It is believed that the charging pile construction of new energy vehicles is of great significance to the development of new energy vehicles and their industrial transformation and upgrading. [3] Figure 1 shows the number of charging piles owned by the major countries of new energy vehicles in the world by 2019. The number of charging piles in China accounts for about half of the world, and the proportion of charging piles is close to the proportion of the number of new energy vehicles in the world.

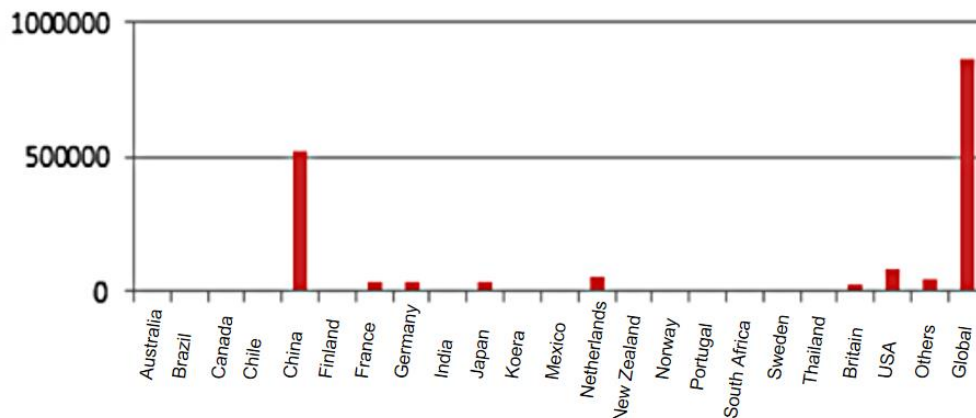


Figure 1. Charging stations (ast and slow) owned by major new energy vehicle countries worldwide in 2019

Data source. "Global Outlook on New Energy Vehicles (2020)" (IEA)

But so far, BYD still has no own charging pile (station) plans. In August 17, 2023, NIO Europe's first third-generation electrical charging station and 500k W ultra-fast charging station were officially launched in Sweden. At present, NIO has accumulated 1,747 electrical charging stations worldwide. By the end of 2023, more than 2,300 electrical charging stations and more than 24,000 public charging piles will be built. The related infrastructure construction of charging stations not only helps to maintain customer stickiness and improve customers' purchase intention, but also plays an important role in the promotion of brand awareness and social responsibility, and enhances the competitiveness of transnational products.[4]

4.2. Technology sharing will achieve a win-win situation and generate additional revenue through battery maintenance and after-sales service

BYD's lithium iron phosphate blade has been available in the Tesla's Model Y rear-wheel-drive model since May to the European market as an entry-level version.

As CATL step by step swallow battery system market share, BYD will blade battery and battery chassis integration technology and European traditional car manufacturers technology sharing, complementary advantages between the traditional automobile manufacturing and new energy automobile manufacturing, have more active voice in the international market, improve the battery shipments, reduce the waste of resources, the use of advanced technology to grab foreign parts market.

4.3. Strengthen the stability and diversified supply channels of the supply chain of new energy vehicles

In the future development of the new energy vehicle supply chain, stability is a key factor. In order to cope with the potential disruption risks in the supply chain, BYD needs to actively consider a variety of supply channels, and conduct a reasonable selection and evaluation of suppliers. By building partnerships with multiple suppliers, the overreliance on a single supply chain can be reduced, ensuring flexibility and reliability in the supply chain. In this way, even if a certain supplier has problems or cut off the supply, the manufacturers can still adjust in time, and maintain the continuity of production.

BYD should also strengthen the core component technology breakthrough and cost optimization. The research and development and production of core components such as batteries, motors, electronic controls and chips require continuous technological innovation and cost control. Manufacturers can

increase investment and research and development of these key component technologies to improve performance, reduce costs and remain competitive in the global market.

5. CONCLUSION

In conclusion, China's new energy vehicle industry, particularly BYD, has experienced substantial growth in the post-epidemic era. BYD's supply chain analysis highlights its strengths in technology, brand awareness, and vertically integrated operations. However, it also faces weaknesses in brand recognition in international markets and supply chain dependencies. Opportunities lie in the growing electric vehicle market and the Belt and Road Initiative, while threats include intense competition and raw material price volatility. To enhance its transnational competitiveness, BYD should focus on infrastructure development, technology sharing, and diversifying its supply chain while ensuring stability and optimizing core component technologies.

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