



Cost Management of New Energy Automobile Enterprises

— Taking BYD as an Example

Lu Wang*

High School Attached to Northeast Normal University, Jilin, Changchun, 130033, China
Corresponding author. Email: luw.shirley@gmail.com

ABSTRACT

As new energy vehicles are determined to be the direction of China's automobile industry development, the entire industry has gradually entered a market-oriented competitive environment. The importance of new energy automobile enterprises to improve cost management and market competitiveness has become increasingly prominent. This paper combines the current situation and existing problems in the cost management of new energy enterprises and takes BYD as a case. Sorting out and analyzing BYD's advantages and disadvantages in cost management and giving suggestions based on the advanced concepts and practices of the industry. Besides, this paper emphasizes that reasonable and forward-looking cost management can enable enterprises to improve efficiency, increase profits, and form a suitable living environment.

Keywords: “new energy,” “automotive,” “cost management,”

1. INTRODUCTION

The continuous rise of the global population and the growth of economic scale, fossil energy, such as oil, coal, and natural gas has caused an increase in the concentration of carbon dioxide in the atmosphere, bringing about a greenhouse effect. The overuse of fossil energy leads to severe problems such as global warming, which has attracted significant attention from all countries worldwide. In this situation, a new low-carbon economic form faces the challenge of energy, environment, and climate change, aiming for low carbon emissions. In order to reduce carbon emissions, people actively use new energy sources, such as hydropower, solar energy, wind energy, hydrogen energy, etc., to protect the environment and achieve sustainable development between humans and nature. The new energy industry is essential for future development since they are environmentally friendly and renewable. Thus, developing the new energy industry has become a significant component of the national development strategy.

Because the research and promotion of new energy technology are still in the exploratory stage, some energy can not be directly applied to people's daily lives. The cost of its conversion and reuse is high. That leads to the

cost of most new energy enterprises being too high. Thus, the profits obtained by enterprises are small, and the willingness of consumers to buy is low. This situation limits the development of new energy enterprises. New energy vehicles are an essential part of the new energy industry chain. So how to reduce the cost of new energy vehicles and make them acceptable to the public is the focus and problem faced by new energy automobile enterprises. This article will be committed to researching the cost management of new energy automobile enterprises, and take BYD Company as a specific case to analyze, study the advantages and disadvantages of its cost structure and control, and put forward corresponding suggestions.

2. STATUS OF NEW ENERGY AUTOMOBILE ENTERPRISES

2.1. Development background of new energy vehicles

The problem of energy exhaustion caused by traditional fossil energy and environmental pollution has prompted new energy vehicles to become the development direction of the automotive industry on a global scale. In China, the State Council issued the

"Energy-saving and New Energy Vehicle Industry Development Plan (2012-2020)", which put forward a purely electric drive strategy and clarified the direction of China's development of the new energy automobile industry. In 2021, China's new energy vehicle sales reached 3.4 million units. The overall sales of vehicles reached 25.8 million. The annual penetration rate of new energy vehicles reached more than 13% for the first time. With the decline of subsidies, China's new energy vehicles have gradually achieved market-oriented development. China's auto industry must be committed to improving the competitive position of enterprises and enhancing the strategic cost management of enterprise competitiveness in order to face the gradual development and comprehensive transformation of global multinational vehicles such as the United States and Europe [1].

2.2. Problems in cost management of new energy automobile enterprises

2.2.1. High labour management costs

In terms of internal operation and management, the management of most new energy automobile enterprises' administrative agencies is too cumbersome, which invisibly increases labour costs. At the same time, too many departments, unfavourable performance reward and punishment systems, and other problems all negatively affect enterprises, which lead to a decrease in efficiency and an increase in administrative costs.

2.2.2. Insufficient design and development capabilities lead to high costs

Reducing costs should prioritize design and development costs, then followed by manufacturing. Because China's new energy enterprises generally have weak design and development capabilities. So many design errors, more extended product design and development time, unstable product quality, high rework rate, and many product shortcomings are fundamental reasons for high costs [2].

2.2.3. Lack of core technology

Compared with the advanced international level, the new energy vehicles industry lacks high-end and high-performance products. The technical foundation is not solid, and some part of the upstream industrial chain is controlled by foreign capital. Taking lithium batteries as an example, compared with international giants such as Panasonic, Samsung, and LG, there is a big gap in domestic batteries' performance and energy density. In addition, some core components in the motor and electronic control system of domestic new energy vehicles also rely on foreign countries.

2.2.4. Scatter resources and weak competitiveness

The new energy vehicle market has a higher requirement in technology, innovation, resources, etc. It is challenging to break through deeply by simply relying on businesses' own strengths. Most Chinese enterprises focus on a specific industry link and lack a complete supply chain system. Besides, the dispersion of resources has led to high costs and weak value competitiveness.

3. COST MANAGEMENT OF BYD

BYD is one of the world's largest suppliers of automotive power batteries and a leader in new energy vehicles in China. BYD is leading in researching and developing lithium batteries and electric vehicles. It first produces dual-mode pure electric and pure electric vehicles. BYD continues to seek the best strategic cost management model and continuously improves its cost management capabilities.

3.1. Advantages of BYD's cost management

3.1.1. Three primary methods to directly reduce production costs

BYD has significantly reduced its manufacturing cost through three methods: vertical integration, self-produced molds, and self-produced "production lines."

BYD started from the battery and then became involved in mobile phones and automobiles' two major manufacturing industries. When it enters the field of new energy vehicles, it follows the "electrification" and "electronic" automobile development path. BYD extensively uses the "vertical integration" strategy and completes most parts' supply chain integration, such as batteries, motors, and electronic controls. BYD transferred the best designers from the mobile phone design department to the automotive department to assist in designing the exterior and interior of vehicles. Its mobile phone division has also established a customer resource platform for battery manufacturers to share customer resources and management experience. Thus, BYD can reduce production costs and improve the level of research and development. More than 70% of BYD's vehicles components come from the company's self-sufficiency supply, and these low-cost self-produced components have significantly increased the profit of each vehicle. Most of BYD Automobile's molds are produced in-house, and it has the most prominent model production plant in China, which can be produced for itself and exported [3].

Additionally, BYD reduces production costs by transforming its own production lines. For example, BYD takes advantage of the low labor costs in China in the production of power batteries and changes Japan's

capital-intensive and fully automatic production line to a labor-intensive semi-automatic production line. Such change makes its cost much lower than that of competitors. BYD fully guarantees its products' regular supply, dramatically reduces production costs and wins a competitive advantage relying on its robust supply chain guarantee system.

3.1.2. Adhere to updating technology

BYD continues to improve design capabilities by making continuous improvements in Tang, Han, Qin PLUS, and other models, indicating the appearance, size, and function. In terms of batteries, BYD introduces the blade batteries, which perform well in their functions, safety, and costs by innovating battery processes and lamination semiconductors. BYD has been continuously developing products for 12 years in terms of power semiconductors, and its products have been iterated to the 6th generation. BYD has also researched the fourth generation of semiconductor silicon carbide by focusing on core technologies and persistence. As a result, the semiconductors' high-temperature resistance, high voltage, and high-frequency performance have been dramatically improved [4].

3.1.3. Enhancing cost competitiveness by diversified product line

In the market structure of new energy vehicles in 2020, the proportion of A-class vehicles is only about 30%. Compared with more than 60% of fuel vehicles, its proportion is significantly less. The reason is the relatively high price of A-class new energy vehicles. Also, another main reason is that the supply of high-quality A-class models is insufficient, and consumers have limited choices [3].

In contrast, BYD focuses on future trends, mainly producing A-class new energy vehicles and designing various models to meet different consumer groups. For example, its PHEV model positioning A-class. Qin PlusDM-i is dominant for cost-effectiveness. Song, PlusDM-i, is positioned in the A-class SUV, while The e-series EV is mainly based on quality and cost performance, mainly towards the young population. With Dynasty series EV Qin, Song, Yuan, and other car series for the public, BYD retains and attracts customers by deeply cultivating the vast market of A-class cars and chasing for high-cost performance and diversified styles.

3.2. Problems in cost management of BYD Company

3.2.1 Labour inefficiency caused by weak production automation

Groundwork and general work constitute the job

responsibilities of BYD employees. The groundwork mainly includes the logistics, production, sales, and after-sales of goods, while the main general work includes enterprise infrastructure maintenance, human resource management, technology development, and product procurement. These works form the value system within BYD. As far as the groundwork is concerned, BYD's new energy vehicles are implementing the model of fixed production by sales, and its "semi-automation" and "man-sea tactics" have reduced the popularity of automation equipment and caused the disadvantage of intensive manual operations. At the same time, because of the low degree of automatic automation, the risk of quality imbalance is increased.

3.2.2 Internal cost optimization lacks a systematic approach

Although BYD has established an internal control system for enterprises, the concept of cost management has not been deeply understood and efficiently implemented by employees. Many unnecessary wastes and consumption situations still occur frequently in the production process. At the same time, within BYD, employees in various departments are too "performing their duties," resulting in simply completing their work mechanically and lacking overall cost management awareness. Employees are unable to truly integrate into the enterprise's cost management and realize an effective cost control strategy from the perspective of the entire organization [1, 5].

For example, in terms of upstream suppliers, although BYD has established an independent procurement system, it lacks the convergence between its procurement, production, finance, and other departments. It adopts a one-person "package" system. A person is responsible for the number of procurement to the measurement to the payment into the warehouse, etc. Once the error is caused, it is difficult to find the cause, causing many problems. Furthermore, in the management of warehouses, its procurement, finance, and warehouse staff lack boundaries in revenue, issuance, and balance. So BYD's cost accounting standards are inaccurate, resulting in the consumption and increase of internal costs. In addition, BYD lacks an effective cost incentive mechanism for all links, which leads to employees' weak overall cost awareness.

3.2.3 Vertically integrated supply chain leads to high costs in some links

Due to the lack of market-oriented competition, BYD vertical integration, extensive and complete supply chain is not conducive to technical exchanges or new product cost reduction. This leads to costs and service links significantly higher than the industry level. For example, new energy vehicles are inseparable from charging piles,

including the cost of charging equipment, installation, auxiliary materials, and after-sales service. For instance, Azure and BYD's 7KW home entry-level new charging piles are free to car owners. Azure has no installation fee, while BYD needs a 0.5K to 0.7K installation fee. Household fast charging class, Winlands uses 20KW charging technology. The price is 9K-11K, BYD uses 40KW charging technology, its price is 12K-13K. However, the satisfaction of the after-sales service of the other two charging piles, from the public online evaluation, BYD's complaint rate is much higher than that of Azure [6].

4. SUGGESTIONS FOR COST MANAGEMENT OF BYD AND NEW ENERGY AUTOMOBILE ENTERPRISES

4.1. Optimize enterprise cost management through systematic cost driver analysis

The production links and products of new energy vehicles have their own uniqueness. BYD and other enterprises in the industry should establish scientific and perfect cost driver research. Then, BYD should establish a cross-enterprise cost management sharing system relying on advanced information science and technology. It might be helpful to find out the defects of cost management by improving the quota management system. After that, BYD can improve the actual cost higher than the target cost by analyzing information and data. Simultaneously, BYD should analyze each life cycle's target cost of automobile planning parts to decompose the cost pressure into specific departments and form a multi-faceted, multi-angle cost control. At the same time, enterprises should record complete original information to ensure that procurement, supply, marketing, accounting are traceable and accessible. Thus, enterprises can control the losses within different steps as much as possible. According to the production and operation mode, they could conduct detailed analysis and research on the human resources situation and product market demand, striving to implement lean production to avoid idle and waste of resources to the greatest extent.

4.2 Reduce the cost of enterprises through an open supply chain platform

With the encouragement of national policies and the acceleration of economic globalization, BYD and enterprises in the industry should not be limited to self-research and self-production under the premise of mastering core technologies. Instead, enterprises should pay attention to improving the quality level of the whole vehicle, reducing overall cost, and actively looking for strategic partners with complementary resources and costs.

For example, Adient and Lear have a global market

share of 50% in automotive seats. In intelligent driving, Huawei, Ali, Tencent, etc., have also reserved many technologies. New energy automobile enterprises cooperating with such enterprises will bring complementary advantages to each side. In that case, they can form leapfrog development in these supporting fields and save the time cost and research and development cost, and at the same time, enjoy economies of scale, reducing the overall costs [2].

5. CONCLUSION

In the environment of vigorously developing a low-carbon economy globally, China has already determined new energy vehicles as the direction of the automobile industry. Thus, the new energy automobile industry has broad prospects for development. Developing of the new energy automobile industry is imperative, whether from upgrading renewable energy to replace fossil energy or reducing the greenhouse effect and protecting the environment. This work takes BYD, a leading new energy vehicle company, as an example, mainly focusing on the advantages and existing problems of the company in cost management. It suggests that the company to improve its cost management through systematic cost motivation analysis and solve the high cost of some links caused by the closed-loop through an open supply chain platform. As the new energy automobile industry enters a period of rapid development, it is bound to experience a process of survival of the fittest, resource optimization, and industrial concentration in the industry. Top enterprises in the industry can improve efficiency, increase profits, form a suitable living environment, and get more development opportunities through forward-looking cost management.

REFERENCES

- [1] Wang Bo (2022-02-21). Opening red: Where did BYD win the championship in January? <https://kns.cnki.net/kns8/manage/export?filename=qcsb20220221a041&dbname=CCNDTEMP>
- [2] LU Shunting & LIU Chang. (2022). "Analysis on the Competitive Advantage of BYD's New Energy Vehicle Exports under the Background of the Belt and Road Initiative. Mall Modernization (02), 75-77. doi:10.14013/j.cnki.scxdh.2022.02.029.
- [3] WU Mengting. Analysis of Securities Investment of BYD Corporation, a new energy automobile enterprise[J]. China Storage and Transportation, 2022(03):163-164. DOI:10.16301/j.cnki.cn12-1204/f.2022.03.084.
- [4] Commercial Vehicles. (2022). BYD's 70,000th pure electric bus rolled off the production line. Commercial Vehicle News (02), 9.

<https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDAUTO&filename=SYQW202202002&uniplatform=NZKPT&v=s0LmoWCh2wJ96kT4XC7wKqxcjcl7jZCgZfuHKEa1kneP-BWYAM1S1OrL7Ows6mJZP>

- [5] SONG Xiaoting. (2021). Analysis on the dynamic mechanism of new energy industry cluster under the background of low-carbon economy. *SME Management and Technology* (Second Half Issue) (12), 52-54.
<https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2021&filename=ZXQX202112018&uniplatform=NZKPT&v=cQMdB6BwvdHFjjx3ns3t8zl-rz7M7V8f-FtzM57tfBajguaedu4S0sEExDHuW0sO>
- [6] WANG Zhenhua & LI Rong. (2021). Current situation and optimization analysis of cost management of new energy automobile enterprises. *Accounting for Township Enterprises in China* (05), 90-91.
<https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2021&filename=XQKJ202105044&uniplatform=NZKPT&v=8aVe18ITlwS6D5ATu3DXCEyTH1mK3O76pd9scCIjwBqloB1yrlx7-dETVIt1eE>

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

