

China's New Energy Vehicle Trade Dilemma and Solutions—A Case Study of BYD

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Abstract. Against the backdrop of global warming and the shift to new energy, China's new energy vehicle industry has experienced rapid development, supported by multiple factors, including technology and policies. However, these efforts to expand overseas are currently facing numerous obstacles. This article, using BYD as an example, explores how Chinese automakers can better enter high-standard markets such as the EU. By analyzing BYD's current challenges in entering the European market, including high carbon tariffs, low consumer acceptance, and limited competitive advantage, and drawing on BYD's core strengths-including blade batteries, pricing, intelligent driving technology, and a supply chain policy focused on vertical integration and supplemented by open collaboration-this article proposes a key development direction for automakers, focusing on technological research and development, supplemented by actively participating in the development of international new energy vehicle standards and regulations, responding to national policies to achieve policy coordination, and strengthening brand awareness and brand image. This approach will further enhance BYD's adaptability in international markets and help more Chinese automakers enter high-standard markets.

Keywords: New energy vehicles; carbon tariffs; policy coordination; rulemaking.

1. Introduction

In recent years, with the intensification of global climate warming, countries have introduced carbon tariff systems and green standards to cope with the pressure of carbon neutrality and carbon peak. This has undoubtedly increased the difficulty for foreign cars to enter the market. Among them, the European Union launched the "European Green Agreement" with the goal of achieving zero emissions for cars and trucks by 2035. This goal has provided policy support for opening up the market for new energy vehicles. At the same time, the Chinese government proposed "Made in China 2025" with the focus on the deep integration of industrialization and informatization, among which intelligent manufacturing and new energy vehicles are key links. New energy vehicles refer to vehicles that use unconventional vehicle fuels as power sources (or new vehicle power devices that use conventional vehicle fuels) and comprehensively apply advanced technologies in vehicle power control and drive to form advanced technical principles and vehicle structures [1]. New energy vehicle companies often bring high energy consumption and pollution to the mining and refining of upstream raw materials (nickel, lithium, cobalt, etc.), which makes export companies not only face environmental pressure, but also bear additional trade barriers. BYD's main development strategy is based on advanced battery technology and highly competitive prices. Therefore, BYD has to bear high carbon tariffs when exporting to the European market, which makes it lose its price advantage when competing with local European car companies. Internally, there are problems such as insufficient basic innovation capabilities and a low position in the global value chain. Therefore, exploring ways to enhance the resilience of the industrial chain is crucial to achieving the strategic goal of high-quality development. Leading companies that play the role of "architects" in building and evolving the entire industrial ecosystem play a key role in guiding industrial goals and integrating upstream and downstream stakeholders. These companies can lead the key cross-domain technology collaborative innovation in the industrial chain and promote the flow and sharing of innovative resources among entities in the chain. Therefore, giving full play to the ecological leadership of leading companies is crucial to enhancing the resilience of the industrial chain [2]. In addition, the

consumer survey has an in-depth understanding of the views of European consumers on Chinese brands and electric vehicles, highlighting challenges such as brand safety standards, brand awareness and cultural differences [3]. For BYD, how to circumvent carbon tariffs and enhance the competitiveness of its products in the international market has become an urgent problem to be solved. This article is mainly divided into three parts. The first part mainly analyzes the difficulties BYD encountered when entering the EU market. Based on the analysis of the difficulties, the second part - BYD's path to solving the trade dilemma. Finally, the third section enriches this study by offering sound recommendations for BYD. Therefore, focusing on BYD's entry into the European market, this study examines how BYD strengthens its corporate capabilities in areas such as innovation, supply chain, and brand building. This article not only analyzes BYD's case study but also aims to help more foreign automakers enter other high-standard markets legally and compliantly. It also aims to theoretically explore the challenges and contributions this phenomenon poses to existing international business theory.

2. BYD's New Energy Vehicle Trade Dilemma

Currently, China's new energy vehicles face several key challenges in the international market.

First, in the battery raw material extraction process, relatively crude technology and processes lead to high energy consumption and emissions. This not only sparks environmental controversy but also raises questions about the sustainability of Chinese products in overseas markets. Second, China's power structure is dominated by coal, which weakens the carbon emissions advantage of new energy vehicles over their entire life cycle, making it difficult to meet the stringent low-carbon requirements of Europe and the United States. Thirdly, geopolitical risks are also gradually intensifying. Some countries, citing national security as an excuse, are restricting automobile imports, interfering with related investments, and limiting infrastructure development. These countries not only face high tariffs but are also labeled "security risks," making market entry difficult. Furthermore, domestic industry standards are not aligned with international standards and lag behind the high standards of developed countries like Europe and the United States, further limiting access to the high-end market. Furthermore, overseas markets are increasingly prioritizing transparency in production processes and carbon footprint data. Currently, Chinese automakers are still insufficiently publicizing this information, which can easily lead to distrust among regulators and consumers. Overall, the international competitiveness of China's new energy vehicles depends not only on product performance and price, but also on deeper factors such as energy structure, supply chain stability, and adaptability of the institutional environment.

Take BYD, for example, which encountered high carbon tariffs upon entering the EU market. The EU imposes a 45.3% comprehensive tariff on pure electric vehicles, while only 10% on plug-in hybrid models. To circumvent high tariffs, BYD has actively promoted plug-in hybrid vehicles in Europe and achieved some breakthroughs: by 2025, sales of pure electric vehicles doubled, and plug-in hybrid vehicles saw a growth from zero to 3,269 units. Meanwhile, BYD is building a factory in Hungary, expected to begin production in 2026, to benefit from tariff exemptions through localized production. This highlights a core issue: BYD needs to enhance its competitiveness through product structure adjustments and localized deployment within the constraints of carbon tariffs and green standards. In addition to the carbon tax issue, raw material supply chain risks also deserve attention. Key raw materials such as nickel, lithium, and cobalt are highly dependent on a few countries, such as Brazil and Chile. This concentration brings price volatility and geopolitical risks. Past collaborations have even resulted in delivery delays and unstable contracts. This means that BYD must confront raw material uncertainties during its expansion, otherwise it will not only impact production capacity but also drive-up overall costs.

The issue of patents and industry standards cannot be ignored. Tesla has rapidly expanded its influence by opening sourcing its patents and has taken the initiative in global standard setting. However, Chinese companies are relatively weak in terms of core patents and standards, which means

that when BYD enters the high-end market in Europe and the United States, it may fall into a passive position due to technology gaps or incompatible standards and even face potential patent lawsuits.

3. Analysis of BYD's Path to Solving the Trade Dilemma

3.1. Policy Coordination and Rule Adaptation

To address the high carbon tariff policy, the Chinese government adheres to the general direction of economic globalization and based on the fundamental policy of trade liberalization, actively signs multilateral trade agreements with multiple countries. Leveraging bilateral preferential agreements such as the Regional Comprehensive Economic Partnership (RCEP) and the China-EU Comprehensive Agreement on Investment (CAI), the government strives for tariff reductions and exemptions, as well as more favorable terms, to create a favorable external market environment for exporters like BYD. Furthermore, the post-pandemic global economic recovery has boosted consumer spending on high-end durable goods. At the corporate level, companies are actively adapting to green trade rules, meeting the EU Carbon Border Adjustment Mechanism (CBAM) and the US Investor Rights Agreement (IRA) carbon emission standards, and reducing compliance costs. They are proactively planning to increase low-carbon production and develop new technologies such as battery recycling and carbon-neutral factory production. Measuring and tracking carbon footprints makes carbon emissions data throughout the life cycle of new energy vehicles more transparent, highlighting their carbon emission advantages.

3.2. Technological Innovation and Brand Upgrade

At the enterprise innovation level, strengthen core technology research and development, increase investment in battery low-carbon production, electronic control, and intelligent driving technology, build a moat through technology patent layout, and deal with the risk of patent litigation. Many technologies today are not mature and still have some safety hazards. For example, some users cannot use the single pedal mode launched by Tesla well, which eventually leads to death in car accidents. Moreover, the current mainstream unmanned driving technology also has safety hazards. In China, the development of the new energy vehicle industry is in line with the current low-carbon economic development background. Some key technologies of China's new energy vehicle industry have already taken the world's leading position, but there are still problems such as low independent innovation capabilities and lack of independent brands [4]. Technological improvement and innovation require a lot of capital investment. If there is insufficient capital, technological development will stagnate, and eventually the company will lag behind in market competition and be unable to cater to the market [5]. Some manufacturers will put some immature technologies on the market for use and make improvements based on user feedback. However, immature technologies are always accompanied by various safety hazards. Once these safety hazards are triggered, they often affect the user experience and brand reputation, thereby gradually affecting the brand's sales in the new energy market and eventually leading to bankruptcy. The iteration of new energy technology is very rapid. In order to seize market share, competing companies in the market are constantly developing various new technologies. This is also a kind of technical pressure for BYD Company. It must adapt to the needs of the market and consumers and cannot lag behind the advanced technology of the industry. Therefore, this places high demands on BYD. The company must pay close attention to the direction of technological changes in the market and the actual needs of users and ultimately make the right choices. [6]

Its main technical route is: in the near future, research battery and vehicle integration technology, and overcome important technical difficulties of new energy vehicles through independent research and development, technical cooperation and introduction and absorption, promote the development of public transportation, and let more Chinese people understand and correctly understand new energy vehicles; in the later stage, overcome core technologies, reach international standards, develop pure

electric vehicles and fuel cell vehicles as the main task, open up the domestic market and explore overseas markets [7].

China's new energy vehicle export trade industry faces the challenge of insufficient brand awareness in overseas markets. Therefore, shaping and strengthening the brand image is particularly important. To overcome this challenge, it is necessary to expand brand influence through a series of carefully planned brand publicity and advertising campaigns. These campaigns can use a variety of media channels, such as social media, TV commercials, online advertising, etc., to convey the core value, technological innovation and product advantages of China's new energy vehicles to overseas consumers. Through creative and attractive advertising content, it can attract the attention of potential consumers, stimulate their desire to buy, and enhance awareness of Chinese new energy vehicle brands [8].

3.3. Localization Operation and Supply Chain Optimization

Expand overseas localized production and accelerate the construction of factories in Hungary, Thailand, Brazil, Germany, etc. to achieve local production and sales, avoid tariffs and logistics costs, and adapt to regional market demand. The supply chain risk of raw materials is also worthy of attention. Key raw materials such as nickel, lithium, and cobalt are highly dependent on a few countries such as Brazil and Chile. This concentration brings price fluctuations and geopolitical risks. In past cooperation, there have even been delivery delays and unstable contracts. This means BYD must confront raw material uncertainty during its expansion. Failure to do so will not only impact production capacity but also drive-up overall costs. It should localize core component procurement to reduce its reliance on a single regional supply chain.

4. Implications and Suggestions for Chinese New Energy Vehicle Companies from the BYD Case

4.1. Technical Aspects

Continuing to play its advantages in batteries, the blade battery cell adopts lithium iron phosphate (LFP) structure, which has less pollution than the traditional battery nickel manganese cobalt (NMC). This is mainly due to the wider application of cobalt. However, cobalt usually coexists with copper and nickel during mining and refining, which not only increases the difficulty of refining but also increases energy consumption. Especially for countries like China where coal-fired power is the main source of power generation, the carbon footprint has continued to rise, which has also become the main reason for the EU's attack. Therefore, improving the technology of cobalt in blade batteries is a top priority. In terms of digitalization, people should continue to give full play to the advantages of domestically produced cars, add more language models that conform to the language habits of other countries, make voice interaction more convenient, accelerate the localization of software adaptation, build a unique technology system to form a moat to reduce dependence on foreign technology, and increase patent layout to prepare for patents in exporting countries in advance. Overseas patent litigation applications focus on battery technology, electric drive technology, electronic control technology, smart charging technology, smart interaction technology, etc. In the research and development of basic technology systems, high investment is essential; in the research and development of new technologies, people should selectively focus on research based on regional and industrial needs; for blocked and difficult-to-break-through technologies, companies can adopt the method of changing tracks and updating technology forms to surpass them. In addition, patent and standard strategies should be formulated. BYD needs to actively participate in the formulation of international standards, especially in the fields of charging interfaces, battery recycling, and battery replacement modes, to strive for more voice. At the same time, people should increase the patent layout of core technologies to avoid being passively beaten in international competition due to lack of technology. By mastering patents and standards, BYD can not only reduce potential market risks, but also enhance its institutional competitive advantages. Only by grasping the innovation of the

entire industry chain can BYD gain advantages in the process of globalization and seize the initiative and voice in the future development of new energy [9].

4.2. Operational Aspects

BYD can enhance the overall appeal and competitiveness of its new energy vehicles by actively addressing challenges related to charging infrastructure. A strong charging infrastructure network will alleviate consumers' concerns about driving range, reassure potential customers, and enhance their confidence in the practicality and convenience of BYD's new energy vehicles. In addition, a sound charging infrastructure will contribute to the overall growth and sustainable development of the new energy vehicle market and create a positive ecosystem for the popularization and success of electric vehicles. The availability and convenience of a sound charging infrastructure are crucial to the widespread application of new energy vehicles. BYD must work with various stakeholders to invest in expanding the charging network and explore innovative charging solutions to overcome the challenges brought about by insufficient charging infrastructure. In this way, BYD can enhance consumer confidence and increase market acceptance of its new energy vehicles, thereby promoting the development of sustainable transportation and reducing carbon emissions.

4.3. Ecological Aspects

BYD must actively cooperate with the government, utility companies and other key parties to overcome this challenge. In order to overcome the problem of insufficient charging infrastructure, cooperation and investment in the expansion of the charging network are needed. By collaborating with the government, BYD can advocate for policies and incentives that promote the development of a robust charging infrastructure. Collaboration with utility companies can help ensure that charging stations have access to reliable and efficient electricity. In addition, BYD should explore opportunities to collaborate with other automakers, charging equipment suppliers, and energy companies to accelerate the expansion of charging infrastructure. Joint ventures and co-investments can help build a fully interconnected charging network, ensuring that users can access charging facilities anytime, anywhere. In addition, BYD can also consider adopting innovative charging technologies and solutions to enhance the charging experience of new energy vehicle users. This may include developing fast charging systems, wireless charging technologies, and intelligent charging management systems to optimize charging efficiency and convenience [10]. In addition, BYD should also improve its supply chain and localization strategies. BYD should promote the diversification of raw material procurement as soon as possible, reduce its dependence on a single country or region, and thus reduce geopolitical risks. At the same time, it should accelerate the construction and commissioning of European factories and increase the degree of localization. This will not only effectively circumvent tariff barriers, but also enhance trust with local consumers and governments and improve market response speed.

5. Conclusion

This paper employs a case study approach to analyze BYD's challenges and strengths. The challenges BYD faces in its internationalization process extend beyond carbon tariffs and green standards to include the fragility of its raw material supply chain and shortcomings in its patent technology. This paper not only summarizes and proposes two coping strategies at the case level—patent and standard layout but also supply chain diversification and localized production—with specific technical recommendations. It also further elaborates on the common challenges faced by new energy vehicle companies in the institutional environment, resource acquisition, and standard competition at a theoretical level. Further analysis through multiple case studies will contribute to the development of international business strategy and institutional theory.

The above phenomenon not only presents BYD with a predicament but also presents new challenges for related theoretical research. First, from the perspective of institutional theory, multinational automakers must navigate carbon taxes, tariffs, and environmental standards within the institutional

environments of different countries. BYD's case illustrates the direct impact of institutional differences on a company's internationalization path choices. Second, from the perspective of the resource-based view, the fragility of its raw material supply chain and the lack of core patents expose the company's limitations in acquiring and utilizing key resources, further determining its international competitiveness. Furthermore, from the perspective of technology and innovation diffusion theory, the differences between Tesla's open-source patents and BYD's responses reveal the paths taken by different companies in the competition for technological standards and their profound impact on the industry landscape.

Therefore, this study not only analyzes BYD's response strategy at a practical level but also suggests, theoretically, that differences in institutional environments, resource dependence, and standard competition will become crucial variables in future research on the internationalization of new energy vehicle companies. This is the potential academic contribution of this article.

Future research could expand this single case study into a multi-case comparison. For example, people can choose China (BYD), the United States (Tesla), and Europe (Volkswagen or Renault) as representatives to compare the difficulties encountered by new energy vehicle companies in the three regions in their cross-border operations: are they facing similar challenges, or are their respective institutional constraints different? Through cross-country and cross-enterprise comparisons, people can more comprehensively reveal the common problems and different paths faced by new energy vehicle companies in the process of internationalization, thereby further enriching the research on international business strategy and institutional theory.

References

- [1] Shang Xiaofeng, Choi Moo Chul. Research on BYD's corporate culture. *International Journal of Advanced Culture and Technology*, 2020, 8(1): 135-140.
- [2] Wang Jinfu, Li Tingting, Zhang Yingying. Research on the path of chain leader enterprises' ecological dominance to enhance the resilience of the industrial chain - taking BYD and China's new energy vehicle industry chain as an example. *Science and Technology Progress and Countermeasures*, 2024, 41(21): 151-160.
- [3] Quint R, Dangelmaier L, Green I, et al. Transformation of the grid: The impact of distributed energy resources on bulk power systems. *IEEE Power and Energy Magazine*, 2019, 17(6): 35-45.
- [4] Lai Y, Li D, Luo Y, Wu G. Analysis of enterprise valuation and future development trends of BYD Company. *Journal Name*, 2023, 1: 440-449.
- [5] Huang Z. Investment risk analysis of BYD Co., Ltd. *Modern Commerce and Trade Industry*, 2019, 40(13): 2.
- [6] De Sousa C D M. Electric Vehicle Manufacturer BYD Expansion into Europe: A Case Study. *ISCTE-Instituto Universitario de Lisboa (Portugal)*, 2024.
- [7] Liu J H, Meng Z. Innovation model analysis of new energy vehicles: taking Toyota, Tesla and BYD as an example. *Procedia Engineering*, 2017, 174: 965-972.
- [8] Gao Yunsheng, Jin Tianyang. Analysis of the international competitiveness of China's new energy vehicles under the new situation. *International Economic Cooperation*, 2021, (4): 65-76.
- [9] Guo Yujie. Research on BYD's overseas expansion strategy under the background of "The Belt and Road Initiative". *Society and Economy*, 2024, 2(1): 46-48.
- [10] Liu C. Analyzing the challenges of BYD in the future based on the current electric vehicle market situation. *Proceedings of the 2nd International Conference on Financial Technology and Business Analysis*, 2023: 49.