

China's New Energy Industry Gains Ground in Global Value Chain: The Case of BYD Auto

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Abstract. In recent years, China's new energy industry has experienced rapid growth, with the China New Energy industry now representing China's innovation and transformation. China has progressed from "catching up" to "leading the way," having shaped the global pattern of new energy. Especially in the automotive industry, BYD has effectively reduced its reliance on the global supply chain through a vertical integration strategy and increased its self-reliance and control capabilities in the new energy industry. This study analyses the implementation pathways and challenges of the strategy from three aspects: technological breakthroughs, full industrial chain arrangement, and globalization construction. Research indicates that BYD's internal development and production of core components such as batteries and electric machines have obviously enhanced the risk resistance of its supply chain. However, the company still relies on external suppliers for high-end chips and key mineral resources. Meanwhile, European Union anti-subsidy investigations and geopolitical factors have created certain challenges for internationalization. Therefore, although vertical integration has improved BYD's control over its industrial chain, it still requires continuous technological innovation, diversified resource strategies, and adaptive localization to achieve sustainable supply chain security and global competition. Through independent research and development and vertical integration, BYD has transitioned from a low-end to a high-end brand, redefining the status of "Made in China" in the new energy vehicle field. This brings significant reference value to the overseas strategies of other Chinese enterprises.

Keywords: China's new energy industry; BYD Auto; vertical integration strategy.

1. Introduction

The global supply chain crisis has exposed the disadvantages of relying too much on globalized division of labor, particularly impacting the automotive manufacturing sector seriously. This has resulted in some companies being forced to stop production due to supply chain disruptions. However, China's manufacturing industry needs to continuously improve, transform the "world's factory" to "high-end manufacturing," and also reduce its reliance on core electronic technologies from Europe, the United States, Japan, and South Korea and so on [1]. As a representative enterprise in China's new energy vehicle industry, BYD has reduced relying on external supply chains through a vertical integration strategy, becoming a pioneer in achieving self-reliance and control within China's manufacturing industry. This paper examines the path and challenges of China's new energy industry in rising within the global value chain, using BYD Auto as a case study. Firstly, BYD's strategic choices challenge traditional theories of global division of labor, providing new directions for research on vertically integrated models in the new digital age. Secondly, BYD has upgraded risk resilience through innovation and supply chain control, which reflects China's typical characteristics in climbing the value chain within the new energy industry—technological internalization, supply chain reinforcement, and value-added enhancement. Finally, BYD's partial success also confirmed in practice the role of technological localization in China's domestic circulation strategy, thus providing important insights for the sustained development of China's new energy industry within the global value chain.

2. BYD's Path to Ascending the Value Chain

Vertical integration refers to controlling the entire supply chain within an enterprise to achieve internalization, hence decreasing the dependence on external suppliers. Vertical integration helps reduce costs, increase profits, enhance R&D capabilities, and improve operational efficiency [2]. BYD's vertically integrated pattern has produced remarkable results in areas such as batteries and electric motors, but it still has significant weaknesses in high-end chips. BYD has introduced select models with autonomous driving abilities, integrating the Orin AI chip into its "God's Eye" intelligent driving system. BYD's autonomous driving system is built on NVIDIA's Orin chip, so this technological dependency prevents BYD from achieving a truly closed-loop supply chain across the entire industry chain [3]. When BYD builds its own factories, it faces more funding issues. Although government subsidies are available, its own abilities are particularly crucial. Then, the European Commission applied a five-year anti-subsidy duty on electric vehicles imported from China, with BYD facing an additional tariff rate of 17.4%. BYD faced potential tariffs and policy barriers in the European market due to an EU anti-subsidy investigation. During internationalization process, the company has been affected by geopolitical factors and trade protectionism, increasing entry costs and uncertainties.

In order to achieve autonomy and control over its supply chain, BYD's strategic layout can be divided into three aspects. Firstly, breakthroughs in core technologies. BYD gained an opportunity by enhancing battery safety and cost advantages through the introduction of Blade Battery, while also acquiring autonomy over key battery materials and structural design [4]. This also demonstrates that BYD has achieved self-sufficiency in core technologies within its supply chain. While the Blade Battery functions normally under standard conditions, it faces challenges when operating in extremely high-temperature environments. Further improvements and research are needed in the heat management system and material performance to ensure the battery's stability and lifetime. It also reveals that autonomous control cannot be fully solved by relying solely on core technological innovation but rather is a process demanding continuous improvement and engineering optimization [5].

Secondly, full industrial chain integration. Through a vertical integration strategy, BYD has full control of production processes from raw materials, batteries, and electric motors to complete vehicle manufacturing, thereby reducing reliance on external suppliers. The key minerals such as cobalt and nickel face supply instability, price uncertainty, and geopolitical risks. Specifically, the majority of the world's cobalt supply relies on the Democratic Republic of Congo, while nickel is concentrated primarily in Indonesia. This geographic location makes the supply chain easily influenced by changes in export policies, such as local government instability and international relations [6]. Even though vertical integration can strengthen BYD's control of the supply chain, relying solely on integration cannot fully ensure stability. Therefore, BYD must combine resource recycling, alternative materials, and supply chain resilience strategies to truly enhance the sustainable development of the whole industrial chain.

The third is globalization. Scholars Chen and Dai point out that for Chinese automotive companies to transition from size to strength; they need to establish overseas factories and local supply chains [7]. BYD's overseas expansion is not limited to a short-term strategy of avoiding tariffs and technological barriers, it also represents a long-term strategy to deeply integrate with local economies, optimize resource distribution globally, and enhance brand influence. This not only assists in market expansion but also enhances the stability of the industrial chain globally. but different markets have different technical standards. With the trend toward regionalization of supply chains, companies trying to replicate complete supply chains globally will face unexpected cost pressures and compliance complexities [8]. This could lead to BYD's intrinsic closed-loop system becoming a possible shackle to flexible localization.

Overall, BYD's path to reducing external dependence and achieving self-reliance is not unique but rather a process that focuses on three interconnected aspects: technological breakthroughs, supply

chain integration, and global expansion. Independent R&D of core technologies forms the foundation, while full supply chain integration provides the necessary protection. Furthermore, global market and production capacity expansion create space for long-term development. Only by implementing these three pathways together can BYD truly achieve supply chain independence and resilience in the future, thereby reducing its relying on external factors.

3. Challenges Facing BYD's Value Chain Upgrade

3.1. External Challenges

In high-value-added fields like intelligent driving, European and American companies have long established strict patent barriers through their technological first-mover advantage, leading to significant intellectual property risks for latecomers. For instance, industry giants Tesla and Volkswagen have formed stronger technological protection through extensive patent distribution. This has resulted in BYD frequently facing patent litigation when expanding into overseas markets, posing substantial obstacles to its globalization strategy [9]. This illustrates that while vertical integration helps control the mid-to-low end of the industrial chain, achieving a higher position in the value chain in a true sense requires conquering core technologies and breaking through the existing patent structure [10].

3.2. Increasing Global Market Competition

As a leading player in the new energy vehicle industry, Tesla has entered the mid-range market through multiple rounds of significant price cuts. This has not only depressed the industry's overall profit margins but also placed direct pressure on BYD, known for its strong value proposition [11]. Simultaneously, traditional automotive giants such as Toyota, Volkswagen, and BMW are accelerating their transformation into the new energy sector to expand and establish their business footprint. Leveraging their powerful brand influence and mature global supply chains, they are building competitive barriers in the high-end market. Furthermore, the rise of local enterprises in emerging markets has added complexity to the competitive environment. For instance, VinFast of Vietnam, as a representative regional company, is rapidly expanding its market presence in Southeast Asia through flexible market strategies and local policy support, thereby putting pressure on the overseas expansion plans of Chinese new energy vehicle manufacturers [12]. Facing these competitive pressures, BYD must climb the global value chain. This requires not only continuous technological breakthroughs but also active responses to strategic blockades from competitors across multiple segments in international markets. This certainly places more challenges on global resource integration and market adaptability [10].

3.3. Internal Challenges

Compared to Tesla and German luxury brands like BMW, BYD has yet to establish a matching premium brand image and consumer trust in mature markets such as Europe and the United States. This directly limits its further advancement within the global value chain [13]. Although the company has achieved breakthroughs in price points by releasing premium models like Yangwang U8, its brand premium remains weak. Tesla, however, has successfully created high-end recognition through its image as a technological pioneer and Marx's personal attraction, while traditional luxury automobile manufacturers rely on historical accumulation and brand equity to secure their market positions. In the global premium market, BYD is considered to some extent a "high value-for-money" brand rather than a "premium luxury" brand. This difference in perception makes it difficult to compete fully with international leaders in the most profitable premium segments [13]. Therefore, the key challenge for BYD to achieve a top-tier position in the global value chain lies in understanding how to transition from "technological leadership" to "brand leadership" and establish a globally influential premium brand [10].

4. Response Strategies

4.1. Establishing a Global Patent Early Warning System

In regarding patents aspect, the company has not only established a patent early warning system for major overseas markets to identify and prevent potential risks of patent infringement at an early stage but also taken positive steps to advance high-quality patent placement. In 2023, BYD filed over 5,000 patent applications overseas, widely covering key technological domains such as blade battery structure technology, intelligent domain control architecture, and autonomous driving sense integration. This shift from passive defense to proactive offense in patent strategy reflects the attributes of both “defensive patents” and “strategic patents” [14]. In addition, BYD’s patent layout exhibits a significant market orientation. The focus of its patent applications highly matches the policy incentives and market demands in regions such as Europe, the United States, and Japan. This not only helps avoid patent barriers but also aims to achieve a role transition from a technology follower to a rule participant through involvement in and formulation of technical standards [15]. Consequently, patent strategy has become an essential core component in BYD’s global value chain upgrading process.

4.2. Differentiated Product Strategy

In terms of products, the company implements differentiated strategies based on different market characteristics: focusing on economy models in emerging markets like Southeast Asia, promoting premium smart vehicles such as the Yangwang and Denza in Europe and the United States, thereby achieving a transition from market share competition to brand value enhancement. Regarding the supply chain, BYD has effectively reduced tariffs, distribution costs, and supply chain risks by establishing local production bases in Thailand, Brazil, and other locations. Localized production not only enhances cost competition but also boosts the brand’s social acceptance in host countries, laying the basis for premium market breakthroughs. Thus, through its strategy of advancing both “products and supply chains” in parallel, BYD shows a strategic transformation from an adapter in the global value chain to a leader in regional value chains.

4.3. Enhancing Value

In terms of value delivery, the company establishes technology experience stores and participates in international events like Formula E to visually display battery and intelligent driving technologies, transforming abstract concepts into perceptible brand experiences. On the design side, BYD partners with Europe’s top design agencies to completely elevate the aesthetic quality of product external and internal designs. Participation in high-end competitions associates BYD with attributes like “high performance” and “innovation,” thus reconstructing its global brand identity. By building experiential frameworks and design innovation as core pathways, BYD is driving its transformation from a traditional manufacturing entity into a premium market participant with both technological leadership and brand premium capabilities. The core objective of BYD’s strategy is to achieve upward movement within the global value chain.

5. Conclusion

This paper uses case analysis and literature review methods, taking BYD Auto as an example, to explore how China’s new energy industry can realize its upgrading position in the global value chain. The research focuses on BYD’s vertical integration strategy, analyzing how this approach helps the company reduce its reliance on external supply chains and strengthen control over key segments of the industrial chain. It summarizes the primary pathways and specific performance aspects through which China’s new energy sector achieves value chain upgrading during its transition from traditional cost advantages to technology innovation-driven development. BYD still faces many challenges in implementing this strategy, including patent barriers in technology, increasing global market competition, and insufficient brand recognition in high-end markets. To address these challenges, this

paper discusses BYD's strategies, such as establishing a patent risk early-warning mechanism, implementing differentiated product strategies for different markets, and enhancing brand value through experiential marketing and event partnerships. Based on the above analysis, enterprises must continue strengthening independent R&D in core technologies, optimizing global patent portfolios, and advancing premium brand development. Governments should improve intellectual property protection systems, provide more institutional support for overseas expansion, and foster collaborative innovation across the entire industrial chain. In the future, China's new energy vehicle industry must continue deepening technological innovation, strengthening international brand positioning, and transitioning from a passive participant to a key leader in the global value chain—thereby contributing to the world's green and low-carbon transformation.

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