Research on the Development Dilemma and Strategies of the New Energy Vehicle Enterprises in Guangdong Province: A Case Study of BYD

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Abstract: This article takes the new energy vehicle enterprises in Guangdong Province as the research object and selects BYD Co., LTD. (hereinafter referred to as "BYD") as a typical case for analysis. Based on the development background of the new energy vehicle industry in Guangdong Province, this research analyzes the current development status of BYD from three dimensions: technological accumulation, financial performance, and market sales. Building on this analysis, the paper further reviews the overall development trends of the new energy vehicle enterprises in Guangdong Province. It summarizes three major development challenges currently faced by the new energy vehicle enterprises represented by BYD. First, some enterprises lack sufficient development and expansion in terms of brand influence and high-end product layout, resulting in a generally slow pace of premiumization. Second, the new energy vehicle industry requires substantial investment. Enterprises rely heavily on external financing for R&D and capacity expansion. Consequently, amidst intensifying market competition and shifting policies, these companies face significant financing pressures. Third, key technologies still rely on external sources, and independent R&D capabilities need improvement. In response to the above issues, this article proposes corresponding development strategies and suggestions from aspects such as enhancing brand value, improving industrial financial support, and strengthening key technology research and development, to provide references for the high-quality development of the new energy vehicle enterprises in Guangdong Province.

Keywords: New Energy Vehicles; Enterprise Dilemmas; Development Strategies; BYD; Guangdong Province

1. Introduction

At present, global energy is becoming increasingly tight and the ecological environment is deteriorating day by day. To actively address the dual challenges of energy and environment and develop a low-carbon economy, the development and application of new energy vehicles have become a focal point of active exploration for the automotive industries worldwide [1]. Meanwhile, a new round of technological revolution and industrial transformation is reshaping the global automotive landscape. The accelerated integration of electrification and intelligence has made new energy vehicles a key track that countries are competing to develop. Against this backdrop, China has positioned new energy vehicles at the core of its national strategic emerging industries. As the province with the largest economy in China, Guangdong Province has actively responded to the national strategy and issued the "Action Plan for Developing the Strategic Pillar Industry Cluster of Automobiles in Guangdong Province (2023-2025)" in 2023. It has listed "accelerating the development of new energy vehicles" as one of the key tasks and is committed to building a modern automotive industrial chain with global competitiveness. As a typical representative of new energy vehicles in Guangdong Province, BYD, with its profound accumulation in battery technology, vehicle manufacturing, and vertical integration of the industrial chain [2], not only firmly holds the top position in global new energy vehicle sales, but also becomes the core engine leading Guangdong and even the Chinese automotive industry towards the transformation and upgrading towards "electricity-driven and intelligence".

2. Statement of the Problem

Under the national strategy of achieving the "dual carbon" goals and building a modern industrial system, the new energy vehicle industry has become an important carrier of new quality productivity. In 2025, China's production of new energy vehicles reached as high as 16.524 million units, representing a year-on-year growth of 25.1%, demonstrating a strong growth momentum [3]. Among them, Guangdong Province has consistently ranked first in the country for new energy vehicle sales for several consecutive years. It has formed a complete industrial chain cluster covering batteries, motors, electronic control systems, complete vehicles, and intelligent connectivity. Increasing the proportion of new energy vehicles has also become one of the development goals of the strategic pillar industrial clusters in Guangdong Province in recent years. With the strong support of the new energy industry in Guangdong, BYD, as a leading enterprise in new energy vehicles, has demonstrated strong development potential. With its headquarters in Shenzhen, BYD leverages the advantages of the headquarters economy to deeply embed itself in the new energy vehicle industry chain of Guangdong and the Greater Bay Area, effectively driving its overall upgrading. However, as the industry scale continues to expand, global competition intensifies, and technology iteration accelerates, Guangdong's new energy vehicle industry has also exposed hidden bottlenecks. These include challenges in breaking through towards high-end markets, development constraints imposed by financing limitations and market uncertainties, and continued dependence on external sources for raw materials, chips, and software. As a "chain master" leading enterprise, BYD's own supply chain management efficiency, technology spillover capabilities, and ecosystem synergy levels directly determine the health and competitiveness of the entire industrial ecosystem in Guangdong. Therefore, this article uses BYD as a micro-case study to analyze the development history, current problems, and optimization strategies of new energy vehicle enterprises in Guangdong Province over recent years. This approach not only helps to understand how "chain master" leading enterprises empower regional industrial clusters but also provides actionable optimization paths for Guangdong to build a "world-class automotive industry cluster."

3. Analysis of BYD's Development Status

3.1 BYD's Development History and Technological Foundation

BYD was founded in 1995 and initially focused on battery production. By 2003, it had grown into the world's second-largest rechargeable battery producer and entered the automotive industry in the same year. In 2006, BYD successfully developed the F3e, its first electric vehicle equipped with a lithium iron phosphate (LFP) battery. Although the F3e was not mass-produced, it marked BYD's early exploration in the fields of power batteries and vehicle integration, laying a solid foundation for its subsequent technological accumulation. Relying on the open and innovative policy environment of Guangdong Province and its own consistent development philosophy of "Technology as king and innovation as the foundation", BYD has continuously broken through key technologies and gradually grown into a leader in the global new energy vehicle field. The blade battery introduced in 2020 has become a transformative technology for the development of energy storage systems [4]. The DM-i Super Hybrid System released in 2021, achieved "oil-electric parity", which sparked the market. The new-generation Magic Cube battery system, MC Cube-T, in 2024 will accelerate the shift of the internationalization strategy and speed up the process of the world's energy revolution. Under the dual support of China's "dual credit" policy and Guangdong Province's promotion policy for new energy vehicles, BYD has risen rapidly. In 2025, its sales of new energy vehicles reached 4.6 million units, maintaining its position as the global sales champion in the new energy vehicle market and leading the sales in Guangdong Province for many consecutive years.

3.2 BYD’s Financial Performance

The financial performance of an enterprise is essentially the most direct and reliable reflection of its operating conditions. As shown in Table 1, this paper selects data such as operating income, asset-liability ratio, and net operating cash flow from BYD's financial statements from 2020 to 2024 for analysis. It is very clear from the overall trend that BYD's revenue growth has accelerated exponentially, with a growth rate of nearly 100% from 2021 to 2022. In 2024, due to

the gradual expansion of BYD's overall scale, the growth rate of its revenue slowed down somewhat, increasing by 29% year-on-year. However, its operating income reached 777.1 billion yuan. This is the result of the explosive growth of the new energy vehicle market and the full release of BYD's production capacity [5]. In terms of debt-paying ability, BYD's asset-liability ratio rose from 67.94% in 2020 to 74.64% in 2024, reflecting that the company relies heavily on debt financing for capacity expansion and technological research and development, and its overall financial structure is relatively aggressive. However, in an excellent balance with this, its net operating cash flow increased from 45.393 billion yuan to 133.454 billion yuan, which is sufficient to easily cover the interest expenses of high debts and short-term debt repayment pressure. Therefore, BYD's capital chain is essentially very safe and controllable. In terms of operational capability, both the accounts receivable turnover ratio and the inventory turnover ratio have increased steadily year over year, reaching 12.47 times per year and 5.40 times per year, respectively. This indicates a significant improvement in BYD's operational efficiency and enhanced control over its upstream and downstream supply chains, effectively avoiding capital occupation and inventory backlog. In terms of profitability, BYD's ROA has generally shown an upward trend, rising from 2.99% in 2020 to 5.31% in 2024, reflecting a significant enhancement in its asset "blood-making" capacity. In terms of development capability, as an innovative technology enterprise, BYD's R&D expenses surged from 7.465 billion yuan in 2020 to 53.195 billion yuan in 2024, representing an increase of over sixfold. This high-intensity investment has not only established core technological barriers such as the Blade Battery and DM-i systems but also built up sufficient momentum for future endeavors, including breaking into the high-end market, achieving intelligent transformation, and expanding globally. To sum up, between 2020 and 2024, BYD has achieved a structural transformation from scale-driven to benefit-driven. The overall financial characteristics have established an endogenous virtuous cycle of "high growth, high efficiency and high profit", which confirms its anti-cyclical resilience and long-term value support as an industry leader.

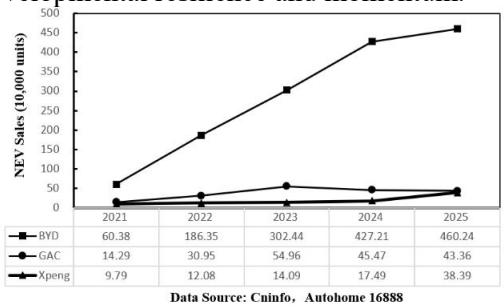
Table 1. BYD Financial Analysis Table

Year	2020	2021	2022	2023	2024
Operating Revenue (100 million yuan)	1565.98	2161.42	4240.61	6023.15	7771.02
Asset-liability Ratio (%)	67.94	64.76	75.42	77.86	74.64
Net Operating Cash Flow (100 million yuan)	453.93	654.67	1408.38	1697.25	1334.54
Accounts Receivable Turnover Ratio (times/year)	3.80	5.96	10.92	9.74	12.47
Inventory Turnover Ratio (times/year)	4.02	4.34	4.45	5.48	5.40
ROA (%)	2.99	1.34	3.59	4.61	5.31
ROE(%)	9.33	3.81	14.59	20.83	20.93
R&D Expenses (100 million yuan)	74.65	79.91	186.54	395.75	531.95
Data Source: CSMAR Database, Corporate Annual Reports					

3.3 BYD vs. Guangdong Peers: Sales Comparison

As shown in Figure 1, based on the ranking of the operating income of new energy vehicle enterprises in Guangdong Province, this article selects representative brands BYD, GAC, and XPeng for comparison. In terms of total volume, BYD's new energy vehicle sales surged dramatically between 2021 and 2025, maintaining an absolute lead. Sales skyrocketed from 604,000 units to 4.602 million units—a nearly eightfold increase over five years. Except for a slowdown in growth after 2024, sales expanded rapidly in all other years, consistently remaining at high levels. GAC showed steady performance, peaking at 549,600 units in 2023 before declining, with sales stabilizing around 450,000 units in the following two years. XPeng experienced a period of consolidation, with sales climbing slowly from 2021 to 2023. Starting in 2024, the company accelerated its momentum, achieving a sales surge to 383,900 units in 2025—a 127% year-over-year increase. Its future potential should not be underestimated. A horizontal comparison reveals that BYD's scale overwhelmingly dwarfs its competitors. Its 2025 sales volume was approximately 10.6 times that of GAC and 12 times that of XPeng. However, leveraging its high growth rate in the later stages, XPeng is rapidly narrowing the gap with GAC, signaling a potential reshaping of the future competitive landscape. Thus, among the three representative new energy vehicle enterprises in Guangdong Province, BYD has

delivered an outstanding performance, with sales far surpassing its peers, demonstrating strong developmental resilience and momentum.



	2021	2022	2023	2024	2025
BYD	60.38	186.35	302.44	427.21	460.24
GAC	14.29	30.95	54.96	45.47	43.36
Xpeng	9.79	12.08	14.09	17.49	38.39

Data Source: Cninfo，Autohome 16888

Figure 1. Sales of Representative New Energy Vehicles in Guangdong Province

4. Challenges Facing the Development of New Energy Vehicle Enterprises in Guangdong Province

4.1 High-End Development is Hitting a Bottleneck

Against the backdrop of the rapid development of the new energy vehicle industry, although new energy vehicle enterprises in Guangdong Province have made remarkable progress in overall scale expansion and market penetration, they still face obvious bottlenecks in the path of high-end and international development. Take BYD as an example. During its high-end development process, it is confronted with problems such as low market acceptance and sales of high-end brands falling short of expectations. Meanwhile, BYD's "cost performance" label has been solidified, which has become a significant barrier for the brand to break through upward. At the marketing level, there is a contradiction between the marketing strategy and the positioning of high-end products, thereby diluting BYD's brand value. In addition, the intelligent labels are weak, presenting a significant shortcoming in market competition. Overall, from the perspective of market performance, although BYD has a certain brand recognition in the global new energy vehicle market, the brand influence of most new energy vehicle enterprises in Guangdong Province in the international market is still relatively limited. The sales direction of their products is generally inclined towards the mid-to-low-end range, and the high-end brand matrix has not been effectively established yet. The formation of this phenomenon has obvious structural reasons. On the one hand, the new energy vehicle industry is a technology-driven emerging industry. Although local enterprises have achieved "technological catch-up", their brand asset accumulation period is relatively short, making it difficult for them to form brand recognition and consumer trust comparable to that of traditional international automotive brands in a short period of time. On the other hand, some enterprises, during their development process, place greater emphasis on scale expansion and cost competitiveness. Their R&D efforts are more focused on the iterative upgrading of product applications. However, there are still deficiencies in core platform architecture, intelligent technologies, and brand narratives, which prevent the technological advantages from being effectively transformed into brand premium capabilities. From the perspective of industrial economics, at present, the Guangdong-based new energy vehicle enterprises are still mainly in the manufacturing and market expansion stages of the global value chain. Their influence in high-value-added aspects such as brand and service is relatively limited. Moreover, the path dependence makes these enterprises prone to adopt a market positioning based on cost-effectiveness, further strengthening the mid-range brand image. The failure to achieve breakthroughs in high-end development not only reduces the profit margins of enterprises but may also push the industry into price competition in international competition, which is not conducive to the upgrading of the value chain and the sustained improvement of long-term innovation capabilities of the Guangdong new energy vehicle industry.

4.2 Financing Constraints and Market Uncertainties

To analyze the changes in the financing structure of new energy vehicle enterprises in Guangdong Province during their rapid development stage, this article selects three representative new energy vehicle enterprises, namely BYD, GAC, and XPeng, and compares the asset-liability ratios of the three enterprises from 2020 to 2024, as shown in Table 2. The asset-liability ratio is the most common and direct indicator for measuring a company's financial leverage level and debt-paying ability. This indicator can examine the degree to which a company relies on external financing in the processes of technological research and development, capacity expansion, and market expansion. From

an overall trend perspective, the asset-liability ratios of the three enterprises have all shown varying degrees of upward trend. This is a direct reflection of the growth in financing demands of enterprises and the increase in the overall financial leverage level of the industry against the backdrop of the rapid expansion of the new energy vehicle industry. Specifically, BYD's debt-to-asset ratio has remained at a relatively high level, rising from 67.94% in 2020 to 74.64% in 2024. GAC's asset-liability ratio has remained relatively stable overall. It was below 40% from 2020 to 2022, rising to 43.04% and 47.61%, respectively, in 2023 and 2024. In contrast, XPeng, a representative of new car-making forces, has seen the most significant increase in its debt-to-asset ratio, which has continuously climbed from 22.99% in 2020 to 62.19% in 2024. From the perspective of an enterprise nature, GAC is a local state-owned enterprise. It has a relatively high credit rating in terms of bank credit and capital market financing. Therefore, its ability to obtain funds is stronger, and its financing channels are more stable. BYD and XPeng are both private enterprises and tend to raise funds through debt financing or the capital market. Therefore, their financing channels are relatively limited. Especially for XPeng, which is in the stage of enterprise growth, the faster it develops, the greater the capital investment it needs. From a theoretical perspective, this phenomenon is closely related to the capital-intensive nature of the new energy vehicle industry and the stages of the enterprise life cycle. During the growth stage, new energy vehicle enterprises often need to invest a large amount of funds in technological research and development, intelligent system development, and production base construction. Therefore, they are more likely to actively and extensively use debt financing and capital market financing. Meanwhile, most of the new energy vehicle enterprises in Guangdong Province are private enterprises. Compared with large state-owned enterprises, their financing channels are relatively limited, and they may face stronger financing constraints in terms of credit acquisition and financing costs. In addition, the competition in China's passenger car market is becoming increasingly fierce. Enterprises are continuously increasing their investment in product research and development, brand promotion, and channel construction. Meanwhile, the demand for new energy vehicles is to some extent affected by the macroeconomic environment and consumer expectations, showing certain cyclical fluctuations.

Table 2. Three Enterprises' Asset-liability Ratio

year	2020	2021	2022	2023	2024
BYD	67.94	64.76	75.42	77.86	74.64
GAC	39.32	39.95	35.67	43.04	47.61
XPeng	22.99	35.80	48.37	56.84	62.19
Data Source: Corporate Annual Reports					

4.3 Insufficient Technological Development

Judging from the current development of BYD, its technological advantages have weakened compared to the early days, the pace of improvement in R&D capabilities has slowed down, and the problem of homogenized competition has gradually emerged. At the same time, there are still obvious shortcomings in the field of intelligence. Against the backdrop of industry competition gradually shifting towards intelligence and software-defined vehicles, BYD has exposed the insufficiency of its AI strategy and the closed loop of data application. In addition, BYD's vertical integration model has encountered marginal crises in the era of intelligence. At the same time, due to the "bottleneck" in core technology fields and mass production bottlenecks, BYD is facing a huge demand for transformation. On this basis, a further analysis of the development status of the new energy vehicle industry in Guangdong Province reveals that most enterprises within the province also have similar problems. From a technical perspective, it is found that there are mainly the following multiple drawbacks. First, from an international perspective, core chips are highly dependent on imports. Developed countries and regions represented by Europe, the United States, and Japan and South Korea respectively occupy 37%, 30%, and 25% of the market share, and have long monopolized the automotive chip industry. The top 8 enterprises in the automotive chip industry account for more than 60% of the market share [6]. The overall domestic production rate of automotive chips is only about 15%, and the proportion of self-developed key products in China is low, which makes new energy vehicles face supply security issues. Second, there are serious bottlenecks in the industrialization of new energy vehicle battery technology. The development of battery cells and their

application in vehicles are confronted with numerous technical challenges, which constantly restrict the large-scale development of related industries. Third, there is an imbalance between the development of components and the whole vehicle. The development of the new energy vehicle industry has long been characterized by "strong whole vehicles but weak components". The R&D investment in traditional components is low, and the independent innovation ability is not strong [7].

5. Development Strategies for New Energy Vehicle Enterprises in Guangdong Province

5.1 Enhance Brand Value and High-End Product Capabilities

In response to the bottlenecks faced by Guangdong's new energy vehicle enterprises in their pursuit of high-end market penetration, this article proposes the following strategies. First, these enterprises should implement brand elevation and differentiation strategies, enhancing their design capabilities in areas such as brand value and cultural connotations. At the same time, through strategies such as in-depth collaboration, they should create new intelligent vehicle brands based on cutting-edge architectures and leading technologies, thereby achieving a transition from value-for-money to value-for-brand and ultimately to value-for-intelligence. Second, Guangdong's new energy vehicle enterprises should focus on "software-defined vehicles" and user experience, prioritizing AI-driven and user-experience-driven approaches to create more natural and emotionally engaging human-machine interactions. Third, Guangdong's new energy vehicle enterprises should accelerate their internationalization and expansion into high-end markets. Leading enterprises should be encouraged to intensify their efforts in exploring international markets and deepening their global industrial chain layout. By establishing overseas R&D centers, participating in international standard-setting, and developing differentiated vehicle models, they can enhance their brands' global influence.

5.2 Improving the Industrial Financial Support System

In response to issues such as limited financing scale faced by Guangdong's new energy vehicle enterprises[8], this article proposes the following strategies. First, the government should enhance the capacity and quality of supply chain financial services for the new energy vehicle sector [9], establishing a "patient capital" support system and a comprehensive industrial chain financial ecosystem. It should encourage state-owned capital and industrial funds to act as "patient capital" to accompany enterprises' growth over the long term. Concurrently, financial institutions should develop supply chain finance, leveraging the credit of core enterprises to provide financing for upstream and downstream small and medium-sized automotive suppliers. Second, financial institutions should innovate financial instruments and leverage multi-tiered capital markets, actively utilizing tools such as green bonds and intellectual property securitization to encourage eligible automotive enterprises to raise or refinance capital through domestic and international listings. Third, enterprises should actively monitor national industrial policies and favorable policies from financial institutions to secure greater policy support and financing resources, thereby reducing financing costs and broadening financing channels [10]. Finally, the government should strengthen policy guidance and risk-sharing mechanisms. Through measures such as loan interest subsidies, risk compensation, and financing guarantees, it should mitigate the credit risks financial institutions face when lending to early-stage technology and capital-intensive projects. Additionally, the government should implement tax incentives, such as additional deductions for R&D expenses, to reduce enterprises' innovation costs.

5.3 Strengthening R&D in Key Core Technologies

In response to the problem that core technologies of new energy vehicle enterprises in Guangdong Province are constrained by external parties, this article puts forward the following strategies. First, the government should guide enterprises to focus their efforts on implementing key core technology research and development projects. It should also bring together the advantageous resources of all participating entities for collaborative innovation, in order to reduce the cost and risks of technological innovation and enhance the enthusiasm of each innovation entity [11]. Second, in addition to focusing on technological development itself, leading new

energy vehicle enterprises should also integrate upstream and downstream suppliers to build a secure and controllable modern industrial chain system, implementing a strategy of "coordinated development between vehicle manufacturers and component suppliers." Third, new energy vehicle enterprises should strengthen cooperation with universities and research institutes to enhance technological supply capabilities from the source, gradually increase investment in basic research, and avoid over-reliance on improvements at the application level. Finally, new energy vehicle enterprises should focus on the efficiency of technology transfer, accelerating the transition of R&D outcomes into industrialization. In this process, the government should encourage enterprises to participate in the formulation and refinement of relevant technical standards, gradually increasing their involvement in the industry standards system.

6. Conclusions

This article takes the new energy vehicle enterprises in Guangdong Province as the research object and analyzes BYD as a typical case. By sorting out the development background of the new energy vehicle industry and combining the situation of BYD in terms of technological accumulation, financial performance, and sales growth, the development status of new energy vehicle enterprises in Guangdong was analyzed. The results show that the new energy vehicle industry in Guangdong has achieved rapid development in recent years and has gradually formed a relatively complete industrial chain system. However, it still faces some practical problems in the process of industrial upgrading.

Specifically, some enterprises still lack brand influence and high-end product layout, and their high-end development is subject to certain restrictions. Meanwhile, the new energy vehicle industry has a large investment scale. Enterprises are highly dependent on external financing during the process of research and development and capacity expansion. Against the backdrop of intensified market competition and policy changes, the financing pressure has increased. In addition, there is still a certain degree of reliance on imports in some key technological fields, and there is still room for improvement in aspects such as chips, high-end components, and software ecosystems. Overall, the new energy vehicle industry in Guangdong already has a relatively solid foundation for development. In the future, automakers need to build an open ecosystem, balance technological innovation, cost control, and ethical security, in order to seize the commanding heights of the global intelligent transportation industry, provide core support for the carbon neutrality goal and the digital economy transformation, and ultimately achieve an industrial leap from "single breakthrough" to "system intelligence".

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References

[1] Lan Fengchong, Kang Yingzi, Ma Weihua, et al. Research on New Energy Vehicle Industry and Promotion Policies in Guangdong Province. Guangdong Science & Technology, 2015, 24(20): 50-52+55.

[2] Lib Q L X. Analysis of Investment Value in China's New Energy Vehicle Industry-Taking BYD Company as an Example. Journal of Advanced Academic Research and Studies, 2024, 1(4): 1-17.

[3] Yu Yongchu. China's Auto Sales Hit Record Highs in 2025, Transformation and Challenges Coexist in 2026. Auto Manufacturing Engineer, 2026, (03): 21-22+27.

[4] Megalingam A, Hariram N P, Sudhakar KBYD blade battery for sustainable mobility: review of technical, economic, and environmental aspects. Energy Storage and Saving, 2026.

[5] Zhang Guofu, Wan Zijian. Analysis of BYD's Financial Performance under Green Supply Chain. Management & Technology of SME, 2026, (03): 183-185.

[6] Lu Chao. Research on Optimization of Marketing Strategy for New Energy Vehicles—Taking BYD as an Example. Marketing Management Review, 2025, (09): 55-57.

[7] Huang Yuling, Fu Guoxin, Huang Shaona. Research on Development Status and High-Quality Development Path of New Energy Vehicle Industry in Guangdong. Guangdong Economy, 2024, (11): 26-30.

[8] Zhang Zhihong. Research on Problems and

Countermeasures in Enterprise Investment and Financing Decision—Taking BYD Company as an Example. China Circulation Economy, 2024, (02): 112-115.

[9] Xu Aihuan, Zhao Junhao, Yang Sirui. The Mode, Difficulties and Suggestions of Supply Chain Finance Supporting the Development of New Energy Vehicles in Guangdong. Guangdong Economy, 2022, (08): 20-27.

[10] Lu Jingmin, Bian Pingping. Research on Financing Efficiency of BYD Based on the DEA-Malmquist Model. China Circulation Economy, 2025, (10): 145-148

[11] Pan Hao. Exploration on the Collaborative Innovation Development Model and Operation Mechanism of Shenzhen's New Energy Vehicle Industry. China Journal of Commerce, 2018, (13): 154-155.

