

Challenges, Solutions, and Policy Suggestions for China's New Energy Vehicle Industry

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Abstract. This article deeply analyzes the main problems facing China's new energy vehicle industry, briefly analyzes the solution, and discusses how the government conducts top-level design and the government's specific measures to promote the development of the new energy vehicle industry. First of all, this article pointed out issues such as insufficient innovation capabilities, limited intelligent application investment, and lagging development of the waste recycling business. In response to these issues, this article proposes solutions such as strengthening technological innovation, connecting the connection between patent cooperation networks, promoting intelligent production, and establishing a standardized waste recycling system. Secondly, this article discusses the policy synergy that the government should consider in the top-level design, including the three dimensions of content, structure, and process, and emphasizes the importance of policy target integration, incentive policy optimization, and policy coherence. Finally, this article proposes that the government can introduce suggestions such as subsidy policies, financial support, talent training, and industrial support, and emphasize the need to improve the need for the new energy vehicle industry chain.

Keywords: New energy vehicle Industry; top-level design; policy Coordination; perfect industrial chain.

1. Introduction

The rapid development of China's energy vehicle industry. In 2022, the cumulative sales of China's new energy vehicle market reached 3.03 million units from January to August, an increase of 107.0% year-on-year, and the penetration rate of new energy rose to 23.3% [1]. This data shows that in 2022, China's new energy vehicle market has maintained a rapid development momentum, and the market size continues to expand. But there are many problems while achieving achievements. First, the innovation capabilities of China's new energy vehicle industry are relatively weak, especially in core technology, such as chips, battery technology, and software algorithms. This shortcoming not only restricts the long-term development of the industry but also affects China's competitiveness in the global automotive industry. Therefore, strengthening technological innovation and improving the ability of industrial chain coordination is the key to promoting the sustainable and healthy development of the industry. Secondly, the application and investment of intelligence in China are relatively limited. Compared with the United States, Japan, and other countries, China's development and industrialization process in the intelligence field is still inadequate. Intelligence is not only related to the performance and user experience of automobiles but also the focus of competition in the automotive industry in the future. Therefore, increasing investment in intelligent applications and promoting the innovation and application of intelligent technology is of great significance to improving the core competitiveness of China's new energy vehicle industry. Third, with the rapid development of the new energy vehicle industry, the recycling of waste and batteries is increasingly prominent. How to establish a comprehensive recycling system, improve the efficiency of recycling, reduce environmental pollution, and become a problem that must be faced in industrial development. The government needs to formulate a reasonable policy to promote the development of the recycling business and promote the recycling of resources. It should be discovered and resolved in time to promote the transformation and upgrading of the new energy vehicle industry. The government plays a vital role in the development of the new energy vehicle industry. Through the formulation of top-level design and specific policies, the government can provide direction guidance, and support

guarantees for industrial development. This includes formulating scientific subsidy policies, improving the financial support system, strengthening talent training, and promoting the implementation of industrial support policies. These government measures will directly affect the healthy development and long-term competitiveness of the new energy vehicle industry. The discussion of these issues is of great significance to the development of China's new energy vehicle industry. This article mainly studies the problems and solutions of China's new energy vehicle industry and the government's specific measures in promoting the development of the new energy vehicle industry. This article has an in-depth analysis of the current status of the industry, clarifies the problem, and takes effective measures with the guidance and support of the government. The Chinese new energy vehicle industry is fully capable of achieving transformation and upgrading, moving towards a greener, more intelligent, and sustainable future.

2. The Problems Faced by China's New Energy Vehicle Industry

2.1. The Ability to Innovate in the Automotive Industry is Weak

The patented cooperation network of China's new energy vehicle industry has expanded rapidly, but the degree of connection between the subjects inside the network is low, and the collaborative innovation capabilities are limited. According to the research of Xiao Xu and Qi Yidong, China's new energy vehicle chip self-sufficiency rate is less than 10%. For cutting-edge technologies such as lithium-ion batteries, solid batteries, skateboard chassis, software algorithms, and Internet of Ve. Year [2]. In response to the following issues, car companies should strengthen technological innovation, accelerate breakthrough core technology, reduce key technologies, and promote the localization of key components such as chips; the government must vigorously promote the integration of production, university, and research, and improve the efficiency of innovation. According to the research of Zhao Zishou, Wang Jiajun, and Fu Tian, the main direction of forward-looking battery technology, includes battery material innovation, battery structure innovation, advanced manufacturing/representation technology, battery digitalization, etc. [3]. The original innovation and basic scientific research of battery technology should be promoted, actively attacking difficulties, mastering more core technologies, and improving competitiveness.

2.2. Intelligent Application Investment Limited

China's new energy cycling intelligent application investment is limited. Generally speaking, in terms of intelligence, the United States adopted the "Google+Annarburg" model to open up an innovative chain from basic research to industrialization [1]. Japanese car companies are constantly exploring new technical solutions in terms of intelligent upgrading. Compared with the United States and Japan, China has begun to promote the hierarchical standards of smart cars in recent years, but it has insufficient investment in the field of intelligent applications. It is difficult to provide sufficient support for smart upgrades. Therefore, China should strengthen intelligent production, vigorously improve the application of advanced technologies such as artificial intelligence, and big data in the new energy vehicle industry; and introduce advanced intelligent production equipment and automated production lines to improve production efficiency and product quality.

2.3. Waste Recovery Business Owed to Development

The acceleration of the development of China's new energy vehicle industry has made more and more waste products. If it is not recycled in time, it may cause harm to the environment. First, the development of my country's new energy vehicle waste recycling business is relatively lagging, the recovery system is not complete, and the recovery efficiency is low. China has not yet established a complete waste car recycling channel. During the recovery process, the technical standards of different companies are inconsistent. The qualified waste car recycling companies recycling scrap vehicles accounted for less than 40% of the car market share. It can be used again that the recovery rate of overall plastic is only 9% [1]. Second, the policy system is large. The consistency of national

policy is good, but there are differences in the number and trend of local policies. The policy systems in the eastern and southern regions are relatively complete, and the western region is weak. Gao Wenfang analyzed the status of the recycling of waste power battery recycling in my country from the perspective of years, region, and focusing on years [2]. Studies have found that the scope of policy coverage has been expanded, and a preliminary policy system has been formed, but there are large differences in the number of policies in different regions in terms of quantity and development. Local policy content is more specific than the national level policy, involving more aspects; the number of policies in the east and southern regions is relatively large, the economy is relatively developed, and the development system related to the new energy vehicle industry is relatively complete, but the construction of the policy system in the western region is relatively weak.

To solve the problem of waste recycling, the country and localities must actively act and formulate a reasonable waste recycling policy. The country must adhere to a game of chess across the country, improve the consistency of policies, and develop the common development of the eastern and western regions. It is also necessary to increase the supervision of the local area and prevent the policy formulation of improper and lazy administration. The state must also formulate standardized and standardized guidance policies, and establish unified industry standards, including the collection, transportation, storage, and processing of batteries, and unified market standards. Locals should actively cooperate with the country, strictly implement national policies, and improve the efficiency of recovery.

3. New Energy Vehicle Industry Transformation and Upgrading Top-level Design Exploration

With the vigorous development of the new energy vehicle industry, the government's role has become more and more prominent. It plays an important role in promoting the healthy development of the industry and preventing illegal acts. The government should follow the general trend of industrial development, and scientifically and reasonably formulate policies to escort the new energy vehicle industry. The top-level design should fully consider the synergy of policy formulation and needs to be realized in the three dimensions of content, structure, and process. With the gradual formation of the new energy vehicle industry policy system, improving policy coordination has become the only way for industrial development [4]. As a result, Wang Luozhong built a three-dimensional analysis framework to analyze the problems and optimization paths of the coordination of the new energy vehicle industry policy [4]. The framework includes three dimensions. The content dimension mainly explores the problem of excessive dispersion of policy goals. The structural dimension mainly analyzes the insufficient structural cooperation and functional collaboration of policy tools. The process dimension discusses the problem of insufficient collaboration between policy subjects. In terms of content dimensions, people must prevent excessive targets from dispersing, such as combining energy conservation and emission reduction targets with technological innovation to form a new unified environmental protection and technological innovation goal. In terms of structural dimensions, the incentive policy structure should be optimized, increased subsidies that are conducive to industrial development, and reduce subsidies to a certain car. In terms of process dimensions, it is necessary to improve the coherence of policies and ensure a game of chess across the country. Promote the effective synergy of policy subjects [5]. Therefore, the government needs to analyze correctly when formulating policies to fully consider synergy. Improve the coordination efficiency of each subject, promote the efficient implementation of policies, and operate stably.

4. Exploring Specific Policies for the Transformation and Upgrading of the New Energy Vehicle Industry

The government needs to promote the transformation and upgrading of the new energy vehicle industry through effective promotion policies. Including subsidy policies, financial support, talent training, and industrial support.

4.1. Subsidy Policy

When formulating the subsidy policy for new energy vehicles, the specific situation of both ends of production and consumption needs to be considered, and corresponding measures are taken to promote the healthy development of the industry and the effective market demand for the market. On the production side, the government should strengthen subsidies for innovative subjects and stimulate the vitality of the R & D entity. It must also provide fiscal subsidies to new energy vehicle manufacturers to reduce production costs. Supply chain cost. Invest in new energy vehicle-related infrastructure to reduce use obstacles. It is also necessary to prevent fraud on the production side. According to Yang Ke's research, there is information asymmetry between the government and the enterprise, and it is difficult for the government to fully understand the actual innovation and operating conditions of the enterprise, which provides an opportunity for "fraud" behavior [6]. The subsidy for the new energy vehicle industry is relatively high. To pursue the maximum profit, some companies may deceive subsidies through false reporting and charging. Sometimes the supervision has imperfect and loopholes. Some companies may participate in the industry because of subsidies, but they do not conduct R&D activities. To prevent fraud, the government should strengthen supervision and establish a reasonable punishment mechanism; at the same time, gradually reduce subsidies, and reduce the independence of the industrial chain since the subsidy of the enterprise.

On the sales side, according to the research of Guo Xiaodan, Pu Guangyu, and Wang Fan, the current subsidy policy of my country's new energy vehicle subsidy policy has effectively promoted the development of a high range of mileage technology. The improvement of efficiency is more obvious, and the impact on other energy consumption (high energy consumption: above 20kW, low energy consumption 0-10kWh) is relatively limited. For 10 to 20 kWh/100 KM vehicles, the subsidy policy has reduced the average energy consumption from 13.959 to 13.764 kWh/100 KM [6]. For 0 ~ 10 kWh/100 KM vehicles, the average energy consumption under the subsidy policy is 9.881 kWh/100 KM. Compared with the subsidized 9.859 kWh/100 KM, the change is slightly small [7]. For 20+ KWH/100 KM vehicles, the average energy consumption under the subsidy policy is 20.757 kWh/100 KM, compared with the subsidy of 20.761 kWh/100 KM, the change is slightly small [8]. This may be because the high-level car audience is wider, the technical maturity is higher, and it is more preferred by consumers. Its properties and market matching are high. Therefore, its demand is more flexible. Therefore, the consumer subsidy policy should meet market demand, and promote the expansion of the new energy vehicle consumer market through products that are more in line with market demand.

4.2. Financial Support

As an important part of the modern service industry, its healthy development plays an important role in supporting the transformation of the new energy vehicle industry. It is necessary to improve the financial support method and correct the flaws of existence. According to the research of Lu Kaiguo, taking Xiangfan, Hubei as an example, analyzed the status of the development of Xiangfan New Energy Vehicle and the current status of financial support for new energy vehicles [9]. Xiangfan City has a certain scale of automobile industry foundation, including 170 car parts enterprises, forming production capacities such as vehicles, engines, and bridges. Breakthroughs in the development of new energy vehicles have more than 20 patents, and some technologies have reached the international advanced level. The complete industrial chain from batteries, motors, and controllers to the entire vehicle is formed. Dongfeng Company Xiangfan New Energy Vehicle Production Base

and other companies have made progress in the field of hybrid power and pure electric buses, and there are products in the market. However, there is also insufficient financial support, limited loans obtained by new energy vehicle companies, and financial institutions lack defects for credit products for new energy vehicle companies. As a result, further research can be conducted. The current status of my country's new energy vehicle industry is similar to the current status of the development of the automotive industry in Xiangfan. my country's automobile industry chain is relatively complete, strong in production capacity, good industrial foundation, and advanced technology. But there are also problems similar to Xiangfan. According to the research of Lu Kaiguo [9], the immature system, interests, and industries are the main difficulties of financial support structural adjustment and industrial upgrading. The policy "three noses" (the industrial policy is not in place, the financial policy is not clear, and the fiscal and taxation policy is not coordinated); "Difficulties" (financial institutions are facing difficulties in conceptual changes, discarding benefits, and difficulty in talent reserves).

Therefore, to solve the difficulties of China's new energy vehicle financial support structural adjustment and industrial upgrading, the government should improve the financial policy and guide the financial industry to support China's new energy vehicles through the current development of China's new energy vehicle industry. The R&D side is underdeveloped [2], so it should be introduced to a credit policy specifically for high -tech R & D stage, set up risk monitoring and assessment indicators, and provide loan discounts and non-performing loans for the new energy vehicle industry. It is also necessary to formulate encouraging fiscal and taxation policies, fiscal subsidies, and tax reductions, which stimulate financial institutions to increase loan support for the new energy vehicle industry. It can also increase the innovation of financial products, develop financial products that are more suitable for actual situations, and accurately promote the development of the new energy vehicle industry.

4.3. Talent Training

The rapid development of my country's new energy vehicle industry requires a large number of talents. Therefore, talent training in the industry is also the top priority. The first is the cultivation of professional and technical talents. The development of the new energy vehicle industry requires a group of new talents who understand technology and bright trends. The vocational college needs to open more related majors to actively promote the training of talent; some head companies can also establish their universities to actively innovate talent training methods. Taking Geely College as an example, Geely College implements the integration of production and education. According to Li Yancheng's research, Geely College transforms the content of the curriculum according to the qualification standards of the corporate position, so that the course settings comprehensively cover the professional skills requirements of the employer for talent [10]. Support teachers to work in Geely Group, cultivate "dual teachers" teachers, and improve teachers' practical teaching skills. Such a way of integration of production and education has greatly promoted the cultivation of counterpart talents. Therefore, the training of reserve talents in the new energy vehicle industry should be increased to increase the vitality of the new energy vehicle industry. Secondly, people must promote the docking of talents. According to Cao Xiaojuan's research, the article takes Hunan Vocational and Technical College as an example, discusses the technical and skill training model of higher vocational colleges in the context of engineering combination, and proposes the talent training model of "school-enterprise cooperation, industry-academia docking" [11]. Based on the principle of mutual benefit and win-win, guided by corporate needs, both schools and enterprises share educational resources, including teaching facilities, training equipment, technical information, etc., improve the efficiency of educational resources, implement task-driven, project orientation, etc. Teaching effect. Therefore, people must vigorously explore the training model of professional and technical talents, actively promote talent-oriented, and promote the docking of talents, so that each person will go to their suitable positions, and contribute to the transformation of the new energy vehicle industry.

4.4. Industry Support

As a high investment in the new energy vehicle industry and long return cycles, the government must increase its efforts to support it to achieve long-term development. New energy vehicle industry support policies can be divided into incentive policies (including tax benefits, fiscal subsidies, etc.); guarantee policies (support infrastructure construction, public procurement, demonstration operation, etc.); and Guide market demand for new energy vehicles). For how to support the new energy vehicle industry, people should adhere to the specific analysis of specific issues and make the best choices based on the actual situation. Deng Lizhi and Liu Jianfeng compared the support policies of the United States and Japan in the new energy vehicle industry [8]. The article proposes that the new energy vehicle industry support policy model can be divided into three models: market drive type, technological leading, and innovative leading type. The United States tends to stimulate the production and consumption of new energy vehicles through tax discounts and fiscal subsidies. In 2002, the United States proposed the "FreeDomcar" collaboration plan to use \$ 4 billion in federal government funds to support automakers to provide consumers who purchased hybrid electric vehicles with a tax reduction measure of \$ 7,000 in bicycles. Electric vehicle subsidies, the maximum subsidy quota is as high as 800 million US dollars. Japan tends to lead technology, that is, focusing on the technology research and development of new energy vehicles to maintain a leading position in technology. In 2010, the "New Generation Automobile Strategy (2020)" was proposed. By 2020, the total sales volume of electric vehicles and hybrid vehicles reached 50% of the new cars sold in Japan, with a total preservation of 13.5 million vehicles. By 2030 This ratio will reach 70%. These data and instances provide a scientific reference for the formulation of China's new energy vehicle industry policy. China should find a support policy model suitable for the country, reasonable application incentives, guarantee and restrict policies, and carry out a variety of scientific and reasonable industrial support to promote the transformation and upgrading of the industry.

5. Conclusion

This study has found that China's new energy vehicle industry has innovation capabilities to be improved, intelligent application investment is limited, and the development of waste recycling business is under development. Technology innovation should be strengthened, the integration of industry-university -research and research should be strengthened, the degree of Unicom of the subject inside the patent cooperation network should be improved, the key technology is dependent on foreign dependence, intelligent production, improves production efficiency and product quality, and formulates reasonable waste recycling policies. The government must scientifically and reasonably carry out top-level design to improve the synergy of policies. It is also necessary to take practical measures, formulate subsidy policies suitable for the actual situation, improve financial support, improve talent training policies, carry out scientific and reasonable industrial support, and improve the new energy vehicle industry chain. This study is conducive to the lack of Chinese new energy vehicles that managers know, and it provides a reference for solving practical problems of new energy vehicles. There is insufficient understanding of the problems in this study, which will deepen research and study and improve articles. In the next step, people will conduct in-depth study and research on the problems and the solutions raised, and continue to provide suggestions for the development of China's new energy vehicle industry.

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