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Exploration on the High-Quality Development Path of New Energy Vehicles in China

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ABSTRACT

With the aggravation of global energy crisis and environmental pollution, new energy vehicles, as an important choice to replace traditional fuel vehicles, have attracted wide attention for their high-quality development. After analyzing the present situation of new energy automobile industry in China and the difficulties it faces in the process of high-quality development, this paper focuses on the internal path of high-quality development of new energy automobile industry in China. Finally, it is pointed out that the implementation path of high-quality development of new energy automobile industry in China should focus on subversive technological innovation, deepening international layout, smoothing information flow in industrial chain and integrating digital elements. This paper clarifies the theoretical logic of the high-quality development of new energy automobile industry in China, and puts forward the practical path of ensuring the high-quality development of new energy automobile industry chain with new quality productivity.

KEYWORDS

New energy vehicles; High-quality development; Subversive technological innovation

1 Introduction

In order to develop new energy technology into a new growth point to promote the high-quality development of China's industry, it is necessary to keep up with the forefront of world energy technology and occupy the top field of new energy. New-quality productivity is the iterative renewal of core technology in the process of social reproduction, which is guided by the practice of green production, and its essence is green development (Wang Shubin, Hou Bowen, Li Yanzhao, 2022).

One of the core tasks of high-quality development is to improve the total factor productivity, that is, to combine factors such as resource allocation and technical level and transform them into the overall efficiency of output(Wang Yiming，2020). Specific to the manufacturing perspective, high-quality development is to achieve scientific and technological innovation and improve the efficiency of resource allocation (Yang Rudai, 2015). With the promotion of great changes in the world in the past century, scientific and technological innovation has become the main battlefield of international strategic game, and scientific and technological change and technology guidance will promote the high-quality development of China's new energy automobile industry (Zou Caicai et al., 2024). One of the strategic goals of China's national development is to build a strong country in science and technology based on the leading position in science and technology, and technological innovation has become the core element to achieve high-quality development.

Based on the above analysis, it is particularly important to explore how to realize the high-quality development of new energy vehicles in China. After analyzing the current situation of new energy automobile industry and the problems it faces, this paper clarifies the theoretical logic of the high-quality development of new energy automobile industry in China, and puts forward the practical path of ensuring the high-quality development of new energy automobile industry chain with new quality productivity.

2 The analysis of the current situation of new energy automobile industry

2.1 Rapid growth in output

In recent years, the government of China has actively promoted the development of new energy automobile industry through a series of policies and measures, such as granting car purchase subsidies, exempting purchase tax, and building charging facilities. The production quantity of new energy automobile has been greatly improved, and the new energy automobile industry has undergone large-scale subversive changes, and it is developing at an unprecedented speed. Before 2021, the total annual output of new energy vehicles in China was less than 500,000 units, and from 2021, the output of new energy vehicles in China began to increase substantially. In 2021, the output of new energy vehicles in China accounted for 12.68% of the total automobile output, but after only two years, this value increased to 31.78%. This

shows that the production and sales of new energy vehicles show a rapid growth trend and become an important driving force for the development of the automobile industry.

2.2 The sales market continued to prosper

With the increasing awareness and acceptance of new energy vehicles by consumers, the sales of new energy vehicles continue to rise. The new energy vehicle market in China has increased from 784,000 vehicles in 2017 to 9.495 million vehicles in 2023, with a rapid growth rate. This growth is mainly due to the joint promotion of policy support, market demand and technological innovation. However, the sales volume of fuel vehicles in China showed an overall downward trend from 2017 to 2023. Especially in 2023, the market share of fuel vehicles further decreased, which also reflected the growing acceptance of new energy vehicles in the market and the government's determination to promote clean energy vehicles. In addition, China has a perfect automobile industry system, and has established a complete industrial supporting system, which has provided a solid foundation for the development of new energy automobile industry.

2.3 Policy support continued to increase

The development of new energy vehicles cannot be separated from the support of industrial development policies. Existing policies are formulated from two dimensions: supply and demand. From the supply side, in view of the new energy vehicle production technology, new energy vehicle industrial structure and new energy vehicle industrial development, the China Municipal Government has comprehensively formulated positive support policies in terms of subsidies, taxes and credit. On the demand side, with the rapid development of the new energy automobile industry, in order to encourage consumers to buy, various government departments in China have formulated financial subsidies, tax incentives, car purchase subsidies and other policies to promote the development of the new energy automobile market.

2.4 Technology gradually mature

China has the technical foundation for developing new energy automobile manufacturing. First of all, with the development and application of digital technology in various fields in China, digital technology has also been widely used in the new energy automobile industry. More and more chips, algorithms and software have been integrated in automobiles, and the manufacturing technology of new energy automobiles has become more and more mature. Secondly, in the development of new energy vehicles, the effective use of artificial intelligence and big data analysis technology can effectively reduce energy consumption and improve driving efficiency. Thirdly, data mining technology has also been applied in the process of vehicle design, manufacturing and sales, which makes new energy vehicle manufacturers more clear about consumer demand and greatly promotes the high-quality development of new energy vehicle industry. Finally, fierce market competition can also force enterprises to develop technological innovation.

3 The challenges faced by the new energy automobile industry

3.1 Intensified market competition

In order to reduce carbon emissions, many countries start with policy regulation and market incentives to promote the low-carbon transformation of the automobile industry and the development of new energy automobile industry. From 2020 to 2023, the domestic new energy vehicle market in China showed a rapid growth trend. Domestic new energy vehicles occupy a dominant position in the market, with sales increasing from 1.367 million to 9.495 million. However, it should be noted that although the base of imported new energy vehicles is small, it also shows a stable growth trend, from 130,600 to 455,800. Domestic new energy vehicle enterprises need to face the risk of increasing the number of imported new energy vehicles and fighting price wars to seize the market. In addition, faced with the pressure from low-carbon transformation and the attractiveness of the new energy vehicle market, traditional automobile enterprises have also begun to accelerate the research and development and production of new energy vehicles.

3.2 The export of domestic new energy vehicles is restricted

Due to the large scale and long industrial chain of the automobile industry, it can effectively promote the domestic economy. If the supporting position of the local automobile industry is weakened and the sales scale shrinks, it will have an impact on its economic growth promotion effect. Therefore, some developed countries have formulated trade protection policies for local new energy vehicles. China's new energy vehicles are mainly exported to Europe, North America and some Asian countries. In June 2024, the European Union decided to impose a temporary surcharge of up to

38.1% on electric vehicles in China. In addition, the regulatory policies of some developed countries also affect the export of China's new energy automobile industry.

3.3 Supply chain security issues are prominent

With the application and promotion of new energy industry in various countries around the world, as the supporting raw materials for the development of new energy industry, the demand for lithium and graphite in various countries is increasing day by day. It is predicted that by 2040, the global demand for lithium may increase by 40 times and the demand for graphite by 25 times. At present, lithium in the world is mainly distributed in Chile and Australia, while China's lithium mine reserves only account for less than 10%. In addition, the mining cycle of lithium ore is long, and the supply of lithium is difficult to meet the needs of manufacturers in time. The International Energy Agency pointed out that one of the high-risk factors facing the development of new energy industry lies in the supply of mineral raw materials. The demand of new energy automobile industry for vehicle specification chips has increased greatly.

3.4 The new technology to the industrial structure of subversion

New energy vehicles are mainly pure electric and hybrid electric, and there are two main sources of power, namely hydrogen fuel cells and power batteries. At present, there are mainly two kinds of power batteries: ternary lithium battery and lithium iron phosphate battery, but these two batteries have the disadvantages of high production cost, long charging time and low temperature resistance. To avoid these weaknesses, the new battery production route is in the initial stage.

At present, there are two new types of batteries. The first type of sodium ion battery has high safety performance, low production cost, low temperature resistance and easy access to production materials. The second is the solid-state battery, which is relatively small, safe and reusable. Hydrogen fuel cell has high energy density, high thermoelectric conversion efficiency and less pollutant output, and can also be combined with renewable energy to generate electricity, which is expected to become the "ultimate energy" in the 21st century.

4 Practical Path of New Quality Productivity to Ensure the High-quality Development of New Energy Automobile Industry Chain

4.1 The construction of disruptive technological innovation breakthroughs

Subversive technological innovation is the main engine to improve the level of productivity and develop new quality productivity (Jiang Yongmu, Xue Weiran, 2024). To effectively achieve the breakthrough of subversive technological innovation. First, improve the support of supporting funds for research and development. In the new energy automobile industry, the innovation of disruptive technology needs to invest a lot of financial resources. In order to ensure the stability of funds in the process of R&D and innovation, the financial department can give some help in tax incentives and financial support to accelerate the process of subversive technological innovation. Second, combine digital technology, grasp the market demand, realize the high-efficiency application of disruptive technology, and improve the input-output ratio of disruptive technological innovation. Thirdly, integrate artificial intelligence into the technological innovation of new energy vehicles, develop new artificial intelligence technologies that meet the market demand, and provide support for the transformation of the new energy vehicle industry. Timely transfer research and development funds.

4.2 Standardization to open the international market of new energy automobile industry

For the development of new energy automobile industry, we must focus on the development of new quality productivity, especially on technological innovation and industrial upgrading. This can not only provide a solid foundation for the standardization of new energy vehicles, but also ensure that China maintains a leading position in the field of new energy vehicles in the world. First, strict product quality standards and exhaust emission standards need to be formulated. This can not only ensure the high quality of new energy vehicle products, but also promote the healthy development of the industry. Second, we should actively participate in the formulation of international standards, promote technical standards with independent intellectual property rights, and make them international common standards. So that China's new energy vehicles can play a leading role in the global new energy vehicle technology field.

4.3 Open up the information circulation channels of the whole industry chain.

Improving the communication efficiency of upstream and downstream enterprises in the industrial chain of new

energy vehicles and reducing the deviation of information elements can effectively promote the modernization of the industrial chain of new energy vehicles. First, with the help of the link effect of new quality productivity, based on digital technology, formulate unified guidelines for the circulation of industrial chain information elements, build an information exchange channel for the industrial chain of new energy vehicles, collect and analyze the information data of the whole industrial chain of new energy vehicles in real time, and report the data analysis results to the upstream and downstream enterprises in the industrial chain in time, so as to effectively reduce the losses caused by the difficulty in grasping accurate information between the upstream and downstream enterprises in the industrial chain of new energy vehicles. Secondly, the information sharing platform of upstream and downstream enterprises in the new energy automobile industry chain should be built by using the effect of technology information gathering and transmission of new quality productivity, so as to construct information exchange channels within the new energy automobile industry chain to improve the transmission efficiency of information elements in each link.

4.4 Deep integration of digital elements and new energy automobile industry

The industrial system forms a deep integration of new kinetic energy digital elements and industrial innovation to guide the development direction of new energy vehicles. On the one hand, vigorously promote digital industrialization. First, tap the value of data elements, promote the penetration of new quality productivity system elements into the new energy automobile industry, and create application scenarios. Create a digital value chain, covering data production, data collection, data storage, data analysis, data application and data value-added, as well as strategic emerging digital formats such as data equipment manufacturing, and strengthen the foundation of digital elements. Second, guide new energy vehicles to connect with artificial intelligence, blockchain, big data, cloud platforms and other fields to help new energy vehicles develop production processes and model innovations; Cultivate new formats and models such as digital production of new energy vehicles, innovative application of industrial Internet, smart factories and intelligent process automation factories.

5 Conclusion

New quality productivity is the innovation and development of Marxist productivity theory. Firstly, by analyzing the concepts of new quality productivity and high-quality development, this paper analyzes the internal logical relationship between them, and reveals the positive effect of new quality productivity in promoting the high-quality development of new energy automobile industry. Thirdly, the paper summarizes the development status of new energy automobile industry, and finds the threats in the process of high-quality development of new energy vehicles in four aspects: market competition, export restrictions, supply chain security and the challenges posed by new technologies to the industrial structure. Subsequently, the article deeply analyzes the mechanism of the new quality productivity enabling the high-quality development of new energy vehicles. Finally, from four perspectives: subversive technological innovation, deep cultivation of international layout, smooth information flow in industrial chain and integration of digital elements, this paper puts forward the specific implementation path of how the new energy automobile industry can achieve high-quality development with the help of new quality productivity.

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