

Research on technological innovation model and performance analysis of new energy vehicles

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Abstract: Compared with traditional vehicles, new energy vehicles have more prominent environmental advantages. In order to promote the technological development of new energy vehicles, the government have given great support in this field. New energy vehicles are widely used in the transportation industry of various countries in the 21st century, which not only saves energy and protects environment, but also effectively promotes the development of China's transportation industry. At present, the main energy sources used by new energy vehicles are electric power and clean fuels. To ensure the normal running, attention should be paid to innovating technological modes and analyzing performance, which is the topic of this paper.

Keywords: New energy vehicles; innovation; complementary; performance

1. Introduction

China has formed a certain international competitiveness in the field of new energy vehicle industry of the world. The development and growth of China's new energy vehicles have gradually realized the role change ,which lead China from a big manufacturing country to a powerful country, and realized the new thinking of China's industrial innovation.Compared with traditional vehicles, new energy vehicles have more prominent environmental advantages, faster driving speed and more scientific and reasonable energy structure. At present, the main internal driving parts of e new energy vehicles have been changed from traditional fuel engines to electric motors. During the driving process, there is no need to activate the automatic gearbox, which means the driving mode is more flexible. To ensure the safe running of new energy vehicles and prolong their service life, it is necessary to regularly maintain them, timely repair driving motor's faults and comprehensively innovate the technological mode. This paper will briefly introduce the basic types of new energy vehicles, systematically expound the technological innovation mode, and briefly discuss the technological innovation performance with examples.

2. Development history of the new energy vehicles

At present, new energy vehicles mainly include three types: pure electric vehicles, plug-in hybrid vehicles and fuel cell vehicles. Among them, pure electric vehicles mainly refer to energy-saving vehicles using on-board charging energy as an important power and driving wheels by driving motor. In the document "Development Plan of Energy Saving and New Energy Vehicle Industry (2012-2020)", new energy vehicles are defined as using new power systems and new clean energy to drive.

There are lots advantages of new energy vehicles, such as fuel saving. Generally, natural gas, petroleum gas, hydrogen and electric power are used as power. In addition, new energy vehicles can effectively reduce emissions and

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effectively protect the environment. Electric vehicles do not produce exhaust gas, and there is no pollution. In addition, this kind of vehicles can recover energy during braking, and supplement electric energy by use of external charging tools to meet the driving energy consumption. Plug-in hybrid electric vehicles belong to hybrid electric vehicles, which are mainly charged by engines and electric batteries, so as to meet the driving energy consumption and maintain the normal running.

Generally speaking, plug-in hybrid electric vehicles not only integrate the advantages of pure electric vehicles and hybrid electric vehicles, but also have the advantages of low cost, flexible operation, fuel saving, good emission performance and low maintenance cost. The main fuel of fuel cell vehicles is hydrogen, which only produce H20 (water) during operation without harmful gases and substances, such as CO (carbon monoxide), HC (hydrocarbon), NOX (oxide) and PM (particulate matter). No pollution and zero emission are the disadvantages. However, it cannot be ignored that the current hydrogen fuel cell technology in China is not mature with extremely high use cost. Therefore, the development and use space of fuel cell vehicles are relatively limited. In contrast, pure electric vehicles have the advantages of low energy consumption rate, zero emission, extremely high energy utilization rate, simple modeling, easy optimization of energy structure, easy use and low maintenance cost, etc., thus wider application range.

3. Existing problems and development direction of new energy vehicles

Like everything else, new energy vehicles certainly have their own shortcomings. Because the new energy vehicles are just in the initial stage, the technical force is not very mature. So the charging is slow, it takes a few hours. At the same time, the vehicle has a short range. Generally, vehicles with small displacement and insufficient power are not suitable for long-distance driving. There are some disadvantages in the charging, gas filling and maintenance of new energy vehicles, which are inconvenient to use. These are all objective problems.

Macroscopically analyzing, there are five kinds of technological innovation modes of new energy vehicle as following. Independent innovation mode, mainly refers to that the automobile enterprises themselves make technological breakthroughs and innovations to develop more valuable technological achievements and upgrade technology into commercial products, thus obtaining higher commercial profits. This mode mainly includes innovation in four fields: technology, product, management and brand.

The imitative innovation mode is mainly to promote complementary advantages and realize the organic integration of various factors through the introduction of technology, so as to improve the enterprises' innovation strength. However, it doesn't mean blind imitation and overall absorption, but targeted absorption, learning and improvement. This is what most new energy vehicle enterprises do to create the existing market. Moreover, the imitative innovation mode does not pay no attention on technology research, but carries out targeted technology research, innovation and improvement, thus creating the unique technological advantages and competitive brands. In addition, in order to realize the technological innovation of new energy vehicles by adopting this mode, the enterprise must possess the capacities of learning, technological analysis, research and deciphering, and improve its innovation ability in knowledge, technology and management through imitative innovation activities.

Cooperative innovation mode refers in particular to cooperation between enterprises, enterprises and universities or enterprises and universities. In this process, resources sharing and complementary advantages will be formed according to cooperation rules and objectives, with risks shared. Innovative objectives will be jointly realized, and the interests of both parties will be improved.

The e-marketing innovation mode. In the information age, e-marketing is common in effectively improving the brand and technology promotion effect, so as in automobile enterprises. The e-marketing platform is adopted to publish marketing information of new energy vehicles and allows consumers to further understand the technological innovation. The production-education innovation mode is the integration of technology, capital and human resources between enterprises and academic institutes. From a microscopic point of view, this mode can be divided into three sub-modes: 1. the production-education research and development mode. The aim of this mode is to improve the

quality of technological research and development, the level of knowledge and the practical skills of talent, and to promote innovation. 2. the school-enterprise cooperation mode. This teaching mode is jointly established by enterprises and institutions, in which enterprises will regularly organize students to participate in technological innovation and research activities, assist cooperative institutions to set up innovative technology research bases, and institutions will cooperate with enterprises to devote themselves to technological research and development. 3. the industry-education co-construction mode. This mode is a further deepening of the first two modes. In the process of running the mode, both the school and the enterprise need to submit the audit report to the education department and the local government. After verification, they will jointly build a technology innovation research institute for new energy vehicles and a talent training base, build a platform for sharing talent, technology, capital, knowledge and information, and further strengthen the cooperative relationship.

According to a survey, most of China's automobile enterprises currently invest little in technological research and development of new energy vehicles, generally below 1% of the total automobile sales, which is much less than that in developed countries. This shows that most of China's automobile manufacturing enterprises do not pay enough attention to the technological research and development of new energy vehicles. This is why China's new energy vehicles are less competitive in the international market. In order to change this situation, China's automobile manufacturing enterprises should change the existing management concept, pay more attention to new energy vehicles' technology, increase capital investment, and improve the market competitiveness in the field of new energy vehicles.

In order to promote the technological development of new energy vehicles, the government departments in China have given great support to this field. For example, many provinces have restricted the purchase of conventional fuel vehicles, and their driving time and road sections. In addition, for vigorously promoting new energy vehicles, the government has given certain subsidies to many models of new energy vehicles, thus effectively lowering the purchase threshold and the selling price. In the future, the government will definitely issue more policies to support the development of new energy vehicles.

4. Increase the content of science and technology and the support of the government

At present, technological innovation for new energy vehicles has achieved good performance in China. Take Brilliance Auto (an automobile enterprise) as an example. While independently researching and developing new energy electric vehicles and continuously improving the driving motor equipment, the enterprise cooperates with Ma Jiaqiang to research and develop new energy vehicle technology. According to statistics, its domestic rate of new energy vehicles in 2018 is as high as 65%, that of independently researched and developed is 95%.

At the beginning of the 21st century, China's new energy automobile industry has begun to sprout and create. In 2001, the new energy vehicle research project was listed in the national major scientific and technological topics, and a major strategic goal was planned to advance towards the goal of hydrogen powered vehicle starting from gasoline vehicle. Since entering the new century, the strategy of "energy saving and new energy vehicles" proposed by China has promoted the research, development and industrialization of new energy vehicles. The technological innovation is continuously improving and new energy vehicles have extremely dynamic performance. Generally, innovation activities of Brilliance Auto mainly include innovating the production configuration structure, increasing product development, researching pure electric vehicles and plug-in vehicles, improving the vehicle manufacturing process, fully introducing new materials and comprehensively cultivating high-tech talent. BYD (an automobile enterprise in China) started research and development of new energy vehicles in 2003 and successfully developed a pure electric vehicle F3e three years later. This new energy vehicle is equipped with the iron power battery under the ET power technology independently developed by the enterprise, making BYD's technological innovation level in the world's leading position. By 2008, BYD has successfully developed the dual-mode vehicle F3DM, marking the leap forward development of new energy vehicles in China. Compared with the previous vehicles, which combines the electric power technology and

fuel driving technology to form a hybrid system, so as to build a perfect vehicle dual drive mode. According to the survey and statistics, it can achieve 100 kilometers of cruising mileage continuously, with a top speed of 150 kilometers per hour. At present, ranking first in China. This shows that China's new energy vehicle technology innovation has achieved good results and will continue to develop.

5. Conclusion

The development direction of new energy vehicles further points to the use of unconventional vehicle fuel as the power source, as well as the use of conventional vehicle fuel. To sum up, in order to promote the technological innovation and development of new energy vehicles, it is necessary to comprehensively adopt independent innovation mode, imitative innovation mode, cooperative innovation mode, e-marketing innovation mode and production-education innovation mode to vigorously promote innovation in technology, product, management and brand, fully introduce advanced technologies, promote complementary advantages and realize organic integration of various factors, thus effectively improving the technological innovation effect of new energy vehicles.the use of new vehicle power device, or the integration of advanced technology in vehicle power control and drive, and the formation of a distinctive car style with advanced technologies, new technology and new structure.

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