Research on the Survival and Development of New Energy vehicles in China

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Abstract. The promotion of new energy vehicles is a global trend. At the same time, it is also an important measure to deepen the concept of sustainable development. The new energy vehicles under the shared economy still face the development dilemma. This article further combines the needs of consumers with the market demand Guide consumers to use new energy vehicles made a number of recommendations; we must actively guide consumer demand, promote green low-carbon consumption, while improving the production of new energy vehicles and production capacity, promote new energy vehicles, user experience and intelligence, Through the marketing and business model innovation to stimulate the vitality of the market so that new energy vehicles better suited to the market.

1. Introduction
In the course of using the traditional automobiles, nitrogen oxides and sulfur oxides are inevitably emitted, which affects the environment. With the increasing attention of the world to environmental protection, the new energy vehicles, based on electric cars, are developing rapidly in China. Under the background of overall macroeconomic growth rate moving downward and the implementation of the 13th Five-Year Plan, effective control of pollutants emissions can reduce environmental pollution. The use of new energy vehicles can build a green lifestyle, better deal with relationship between people, human, and nature. We will actively guide consumers’ consumption demand and focus on improving the production capacity and technical level of new energy vehicles.

2. New energy vehicles

2.1 Definition of new energy vehicles
New energy vehicles are defined relatively broad, usually its power comes from unconventional gas, oil and other fuels, or use of conventional vehicle fuel combined with high technology in vehicle driving and propulsion. , Adopting new vehicle propulsion device. Combined with the formation of a vehicle with new structure and new technical principle[1].

2.2 Types of new energy vehicles
There are many brands of new energy vehicles in the market. Among them, new energy vehicles developed by enterprises include pure electric vehicles, hybrid electric vehicles, fuel cell vehicles, hydrogen engine vehicles, and other new energy vehicles. The utility of these different energy vehicles has a certain gap, at the same time, the performance and characteristics are also different.

2.2.1 Pure Electric vehicles
Pure electric vehicle uses electric energy as power source, battery provides electric power to the drive
system[2]. Compared with internal combustion engines of conventional vehicles, the drive system of pure electric vehicles is an electric motor that converts electric energy into kinetic energy, while the battery becomes fuel tanks of conventional energy vehicles.

2.2.2 Hybrid electric vehicles
A hybrid electric vehicle is a "joint drive system", with two or more units can be started simultaneously, can be switched or run simultaneously to provide kinetic energy for the vehicle. From the current level of technology, hybrid electric vehicles generally refer to hybrid petrol-electric vehicles, which can have both motor and engine.

2.2.3 Fuel cell vehicles
Fuel cell vehicles get chemical reactions from fuel cells into electricity to supply electricity to cars and drive vehicle. The power supply principle of fuel cell vehicles has nothing to do with the consumption of energy, and there is no harmful substance in the products of hydrogen and oxygen chemical reactions and no emissions.

2.2.4 Hydrogen engine vehicles
Hydrogen fuel vehicles are different from hydrogen fuel cell vehicles in drive systems, which use internal combustion engines to generate driving forces through the combustion of hydrogen and oxygen, rather than chemical reactions During combustion no dust and carbon dioxide and other waste gas pollutes environment, only a small amount of pure water[3]. Because of the combustion ability of hydrogen and oxygen, the purity of hydrogen is not high and the diffusion coefficient is large. Once exposed to oxygen, it will produce a wide range of combustion.

2.2.5 Other new energy vehicles
In addition to the above several new energy vehicles, after the engine has been modified, DME can be used as vehicle fuel. Dimethyl ether is a non-toxic, colorless gas at ambient temperature and atmospheric pressure with a slight smell of ether can be compressed for liquefaction storage. There are many sources of Dimethyl ether, which can be made from coal, natural gas, petroleum coke and other raw materials.

3. Factors affecting the use and purchase of new energy vehicles
In order to make a substantial breakthrough in the future development of the new energy automobile industry, the subjective aspects need the efforts of the automobile enterprises themselves and through constant innovation and research, promotes the manufacturing level, and promotes the manufacturing capability of the new energy automobile industry in each aspects. Objective aspects need to enhance consumers' purchase and use willingness, guide consumers to carry on the experience and consumption, and guide low-carbon consumption patterns.[4]Only then the subjective and objective aspect commonly developed, can make the new energy vehicle better adapt to the market demand.

3.1 Consumer psychological factors
In our transportation life, perceived behavior leads people’s way of travel, and friends, families, and other important reference groups have an impact on the choice of consumer travel mode. Thus influence the consumer's attitude and willingness of consumption, in the collectivism-oriented culture which emphasizes the "social orientation", it is the social result and the image characteristic that occupy the dominant position in the perceived value of the Chinese consumers. Subjective norms, group norms and other people's evaluation are the key factors that affect consumers' purchasing and using behavior. Therefore, the conceptual model of green travel psychological factor is finally constructed as shown in figure 1.
3.2 actors affecting consumers use of new energy vehicles
Taking pure electric vehicles as an example, the length of the battery charging and the performance of battery directly affect consumers’ willingness and acceptance of new energy vehicles. The reasons for the purchase of new energy vehicles include the cost of buying a car, the cost of energy consumption in the course of driving, the speed of travel and the mileage of the car. At the same time, consumers are very concerned about the size of the engine. The safety, reliability, use cost and purchase cost of new energy vehicles are the factors that consumers consider more when they choose to buy.

3.3 National policy factors
In recent years, the national government has always been supporting the new energy vehicles with policies and funds. The development plan of "Energy-saving and new energy automobile industry"(2012 - 2020) points out the direction for the new energy automobile industry. [5] By using public media propaganda to enhance consumers' use of new energy vehicles, to increase their purchase willingness. At the same time, by setting up tax breaks for new energy vehicles, they can reassure consumers and increase consumers' awareness of green travel and the use of new energy vehicles. As shown in figure 2.
4. Analysis of the current situation of new energy vehicles at home and abroad

New energy vehicle becomes an important innovative product after the policy of sustainable development of motor vehicles. Overseas, many countries have just passed the announcement of the total ban on fuel vehicles sales, such as the United Kingdom, France, and the Netherlands, have taken steps to reduce the use of diesel passenger cars. In China, the National Development and Reform Commission has made it clear that, in principle, traditional fuel car companies will no longer be approved for new construction. Therefore, the development trend of automobile industry in the future is new energy vapor. China's new energy automobile industry has been listed in the rapid development of enterprises. However, due to the lack of awareness of green travel and shortage of new energy vehicle technology, the popularization and development of new energy vehicles are still facing some difficulties.

4.1 Underdevelopment of core technological innovations

The core technology of new energy vehicles is an important factor that restricts its development. Take the electric vehicle as an example, the core component of the electric vehicle is battery, and conventional electric vehicle uses lithium battery. In recent years, the development of new energy vehicles in China is still in a new stage of emerging, and technical performance is not mature enough. The energy density, power density, tolerance, cycle charge and discharge times and safety of power lithium battery in new energy vehicles still need to be improved, and the improvement of time of use still needs to be improved.

4.2 Excessive dependence on government subsidies and preferential policies

In recent years, the sales and development of new energy vehicles in China have been relatively fast, due in large part to the promotion of policies. However, if we regard it as the only means of development and blindly relies on policies, China's independent innovation brands will lose the opportunity of rising in the field of new energy vehicles and surpass foreign brands. Today, the independent brands price of electric vehicle in the Chinese market is more than 200,000-300,000 RMB, thanks to preferential policies from the central government and financial subsidies at the local level, the stubborn high prices have fallen back to more than 100,000 RMB. If the financial subsidies are reduced, the prices of new energy vehicles will continue to rise, which will have a great impact on the whole new energy automobile industry in China.

4.3 Inadequate infrastructure

Compared with the large, mature and convenient traditional vehicle refueling mode, the electric vehicle is far from equipped with charging facilities. According to relevant statistics, the countrywide charge piles have reached nearly 200,000 in 2016, and more than 80% of the private vehicles are equipped with charging piles. At the same time, in order to cooperate with the promotion of electric vehicles, the State Energy Administration plans to increase the number of charging piles to 800,000 in 2017, including 100,000 public piles and 700,000 special piles. At present, charging pile products generally have stubborn problems such as poor experience, slow charging efficiency, high safety risks, low level of profitability problem, etc, which need to be further optimized by enterprises.

5. Analysis of the principle of guiding consumers to use new energy vehicles

5.1 Multi-ways in reduction of acquisition cost of new energy vehicles

It is necessary to reduce the overall cost of purchasing new energy vehicles from three aspects: government subsidies, reducing production cost and providing financial support. [6].

5.1.1 Government has increased its support for new energy vehicles.

On one hand, it is necessary to increase the support of the municipal utility group to the hybrid-power bus. On the other hand, to increase the support of new energy car for home. The more thoroughly the
government's policies are implemented, the more competitive the price of new energy cars will be.

5.1.2 Enterprises undertake technological development to reduce production costs.
Hybrid-electric vehicles, for example, are popular because they can greatly improve fuel efficiency and reduce the cost of use. However, the system of hybrid-electric vehicle is relatively complex, the cost of power plant is high, and it is difficult to realize industrial production, so there is a contradiction among energy efficiency, technical difficulty and low cost.

5.2 Focus on product research and development, improve user experience
In addition to car prices, safety and comfort of the car, as well as the vehicle's mileage and charging time are also the focus of attention. The comprehensive performance of vehicles is the second important factor that affects consumer's purchasing behavior. Therefore, it is necessary to solve the problems such as short range, long charging time and improve safety and comfort of pure electric vehicle. [7]

![Figure 3: BYD E6 electric vehicle](image)

5.2.1 Continuation of journey
Battery capacity determines the continuation of journey of electric vehicles. Electric vehicle enterprises faced such a dilemma in the production: First of all, To improve the endurance of battery, they have to add battery, but because of the heavy weight of battery, as the number of batteries increases, the increased endurance mileage will be gradually shortened, which will undoubtedly increase the cost of manufacturing and use of electric vehicles; Take BYD E6 electric car as an example, which weighs 2.35 tons, much heavier than the average intermediate-level car. It is mainly because the battery pack weight is already close to one ton. So, to improve the vehicle model and the light weight of battery as well as the expansion of battery capacity becomes the urgent problem to be solved.

5.2.2 Charging mode
The conventional charging mode has a low charge current, about 15A, full battery–filled time is usually seven hours, and some models even up to 15 hours. Obviously, this has brought a lot of inconvenience to people, and it is also one of the important factors that restrict the popularity of pure electric vehicles. But the charge of fast charging current is relatively large, about 300A, the time of full charge is about 1/10 of the conventional charging time, which is almost the same with the refueling time of the fuel car. However, because the current of this charging mode is large, the demand for charging equipment is very high, and the requirement of load capacity of power supply network is also very high.

5.2.3 Vehicle networking and intelligent network-connected vehicles
The concept of Big data, Internet of things, smart home, is presumably no longer unfamiliar to people. Intelligence, information network, automation, these concepts are moving into tens of thousands of households, and also permeated into the future development of the automobile industry. If driverless cars are designed and built in line with the future, then new energy vehicles are preempting the frontiers of technology by virtue of their "late start" advantage. With the development of automobile industry, Functional trend is becoming more and more prominent. Network connection technology is one of the branches of this kind of multi-dimensional extension.[8]In order to seize the market heights, the manufacturers of new energy vehicles have laid out advanced auxiliary driving systems, docking sophisticated intelligent network technology, embedded sensors, radar and other new ancillary components, dedicated to add more additional value to the products.
5.2.4 Internet + New Energy vehicle Model
In the era of shared economy, after sharing bicycles, sharing cars have sprung up in recent years. After sharing bicycles, the emergence of sharing car app has established the relationship between people and new energy vehicles. In "my Nanjing" APP, The shared car platform appears in the public's view. In the new energy car rental interface, As long as citizens authenticate their real names, upload their driver's licenses, verify their identities, pay a deposit of 1,000 RMB on the APP certification, and then they will not need the car keys. And using mobile phone scanning code to borrow cars can see rental network distribution nearby.

Figure 4: "my Nanjing" shared car

5.3 Improve the popularization of supporting facilities
New energy vehicles has the advantage of Energy saving and environmental protection, the cost of later use is much lower than traditional fuel vehicles, but "supporting facilities" is also one of the main factors restricting consumers to buy new energy vehicles. Due to the "hard to charge" problem of pure electric vehicles, its market acceptance is not high. Most electric vehicles are going to the rental market and taxi market, individual consumers buy very little. Therefore, the popularization and construction of charging piles play a great role in promoting the popularization of new energy vehicles.

5.4 Work with the media to increase publicity
New energy automobile manufacturers should strengthen the cooperation with various kinds of media, especially new media. Publicizing the importance of green travel to the public, as well as the function and technical advantages of new energy vehicles, can promote the consumption of new energy vehicles. In the age of information explosion, everyone receives new information every day in a variety of ways, because we are surrounded by information sources everywhere. The media to the new energy automobile technology renewal and the product performance promotion will push the whole new energy automobile industry to develop rapidly.

6. Looking forward to the future development of new energy vehicles
First, new energy vehicles, especially electric vehicles, are growing rapidly, and there will be development opportunities for related enterprises in the next five to ten years.
Second, China's policy framework and policy system on new energy vehicles, after more than a decade of exploration and development, has been basically established and gradually matured.
Third, with the huge demonstration and popularization benefits of the electric vehicles promotion plan, the electric vehicles industrial ecology has been gradually formed, and the market development been gradually matured.
Forth, using the policy framework cultivated by the state and the support of resources, such as funds, to promote the industrialization of new energy vehicles research and development through the new technological revolution of the mobile Internet, to create a greener, more ecological, more intelligent,
simpler, more interesting car culture in the future.

7. Concluding remarks
In the face of the worsening ecological environment and the shortage of ecological resources, the new energy automobile industry in our country has developed rapidly. In the future, the development trend of the automobile industry is the new energy automobile. However, the new energy automobile needs a broader consumer market. At the same time, consumers are not strongly interested in the use and purchase of new energy vehicles, so the new energy vehicles are faced with development dilemma. Therefore, it is necessary to make an improvement on new energy vehicles from the innovative production to supporting facilities in combination with the consumers' willingness and market demand, actively guide the consumers' consumption demand, advocate the green low carbon consumption mode, and improve the consumers' green consumption consciousness so as to promote the development of the whole new energy vehicle market.

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