Research on the Development of New Energy Automobile Industry Cluster in Anhui Province from SWOT Perspective

Qian Huang

Public Affairs Department , West Anhui Health Vocational College, Lu'an237000, Anhui, China

Abstract. The development of new energy vehicle industry cluster has become an inevitable trend of the development of China's new energy vehicle industry. Anhui province should seize the historical opportunity of the great development of new energy vehicle industry and promote the development of Anhui new energy vehicle industry cluster.On the basis of the development status of new energy automobile industry in Anhui province, through SWOT analysis, the development of new energy automobile industry cluster, the research found that in Anhui province, policy, market and talent advantages, there are certain opportunities in new energy vehicle demand and oil prices, but in technology, infrastructure and regulatory disadvantages, and competition threats from external new energy automobile enterprises.Then, the SO strategy analysis, WO strategy analysis, W O strategy analysis and WT strategy analysis were analyzed with the SWOT matrix.In addition, suggestions are put forward on how to overcome the competitive threat from internationally famous new energy vehicle enterprises and reduce the disadvantages in technology, infrastructure and supervision in the development of Anhui New energy vehicle industry cluster, in order to provide reference and thinking for the development of Anhui new energy vehicle industry cluster.

Keywords: SWOT analysis; Anhui Province; New energy vehicles; Industrial cluster.

1. Introduction

Since the outbreak of the epidemic, the impact of COVID-19 on China's international trade has been very obvious, involving orders, labor, raw materials, logistics and other links.Anhui province, meanwhile, has also been hit by the COVID-19 pandemic.However, crises often harbor opportunities and hope.Under the background of rising international oil prices, more and more automobile consumers turn their eyes to new energy vehicles, coupled with the national policy support for the new energy vehicle industry, the new energy vehicle industry has ushered in a new opportunity for development.Anhui province, which has the technical foundation, should seize this opportunity, actively invest in the research and development of new energy vehicles, and vigorously explore the new energy vehicle consumption market.To find new areas for Anhui economy affected by COVID-19, and promote the high-quality development of Anhui economy.

Industrial cluster is a common feature in the process of industrialization of various countries, and also the main foothold of the development of China's manufacturing industry.Industrial clusters can promote the division of labor and cooperation by using the adjacent attributes of geographical relationship, which can reduce costs, improve efficiency and improve product competitiveness.Industrial clusters can promote industrial development and enhance regional competitiveness.For example, Detroit in the United States and Toyota City in Japan are both typical cases of industrial clusters to promote regional industrial development. Therefore, this paper will explore the development of new energy vehicle industrial cluster in Anhui Province from the perspective of SWOT analysis.

2. The development status of new energy vehicles in Anhui Province

In terms of production capacity, the automobile production capacity in Anhui province exceeded 1.5 million vehicles in 2021, hitting a new high in nearly five years, ranking the seventh in China, with a year-on-year growth of 29.5%, far exceeding the national average level.As can be seen from Figure 1, from 2016 to 2021, the overall output of ne

w energy vehicles in Anhui province showed an upward trend.After a brief pullback in 2019 and 2020, the rapid growth occurred in 2021. In 2021, the province produced 252,000 new energy vehicles, a record high, with a year-on-year growth of 1.4 times, accounting for 7% of the national proportion.Among them, Chery produced 109,000 new energy vehicles, up 1.4 times year on year.Chery's new energy vehicle "Little Ant" sold over 250,000 in four years. QQ Ice Cream has received 70,000 orders in the pre-sale period since July 2021; NiO delivered over 10,000 and 91,400, up 109% year on year; JAC produced over 40,000.The force of new energy vehicles, Anhui automobile production climb support role is obvious.

In 2021, under the adverse circumstances such as insufficient chip, battery lack, labor reduction, material rise, export difficulties and so on, Anhui province continues to adjust policies, consolidate the new energy vehicle industry supply chain, improve the production efficiency of new energy vehicle enterprises, so that the province's new energy vehicle industry into a new level.

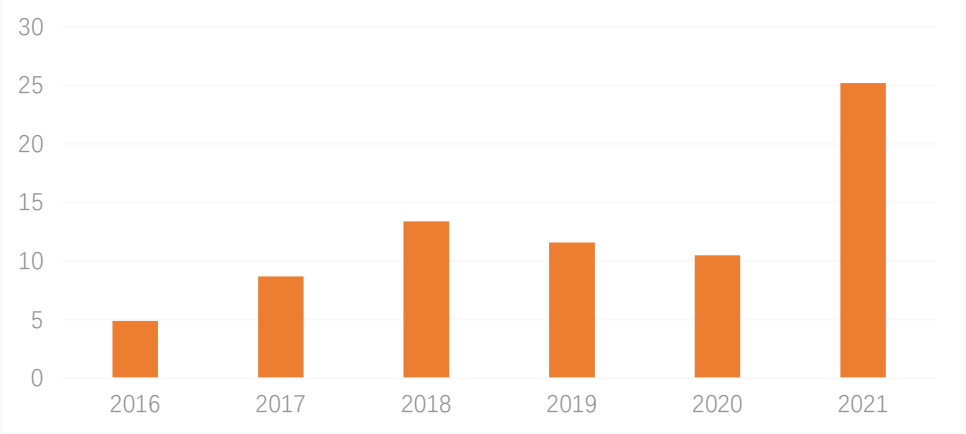

Figure 1. 2016-2021 Production of new energy vehicles in Anhui Province

In terms of policy, Anhui Province issued the Action Plan for Anhui New Energy Vehicle Industry Development 2021 (2023) in 2021.By 2023, the output of new energy vehicles will account for more than 10%, and the nearest matching rate of parts will reach more than 70%; new energy vehicles and key parts will reach the international advanced level.at the same time, Corresponding supporting measures have also been introduced, For the approved research and development of common key technologies and industrialization projects, A subsidy of up to 50% is given to the undertaking unit, The maximum subsidy amount for a single project is 30 million yuan; For a newly established independent legal person production enterprise in Anhui province with a paid-in capital of us $10 million or over 100 million yuan, And used for the provincial project investment of new energy vehicle industry multinational companies, domestic top 10 vehicle enterprises, key components (battery, motor, electric control, equipment, materials, The same below) Top 10 enterprises, After the identification, For a reward of $3 million for each $10 million or $100 million paid, The maximum reward amount is 50 million yuan.Each new company leads the formulation of international standards, national standards and industry standards in the field of new energy vehicles, Give a one-time reward of 2 million yuan, 1 million yuan and 500,000 yuan respectively; For each new provincial enterprise on 1 new energy vehicle product announcement of new energy commercial vehicle sales reached 100, Or new energy passenger vehicles sales reached 2,000 units, The province will give a one-time reward of 1 million yuan respectively; For the enterprises listed in the enterprise catalogue of the Standard Conditions of the Automobile Power (Storage) Battery Industry, The province gives a one-time reward of 2 million yuan; For the provincial enterprises where the sales of new energy vehicles (passenger vehicles and commercial vehicles) and the proportion of the national sales of new energy vehicles increased by 0.5 percentage points or more compared with the previous year, The province gives a one-time reward of 5 million yuan, Three consecutive years of sales growth of 0.5 percentage points or more, Another reward of 10 million yuan; The annual sales of new energy commercial vehicles reached 1,000 or more, respectively, Or new energy passenger vehicle production enterprises reaching 10,000 or more in the province, The province will give a one-time reward of 3 million yuan

and 5 million yuan respectively.These policy support has injected impetus into the development of the new energy vehicle industry in Anhui Province.

In terms of industrial coordinated development, Anhui Province and Shanghai, Jiangsu and Zhejiang have jointly set up the New energy Vehicle Industry chain Alliance in the Yangtze River Delta region and the national Internet of Vehicles pilot zone in the Yangtze River Delta region. 11 new energy vehicle manufacturing enterprises in Anhui have become the first member units of the new energy vehicle industry chain Alliance in the Yangtze River Delta region.At the same time, many departments in Anhui province jointly promote the implementation of new energy vehicle related policies, and actively explore cooperation with other regions in China.

3. The SWOT analysis of Anhui province to build a new energy vehicle industry cluster

3.1 Advantages analysis

A. Policy

The Anhui Provincial government has issued the development plan of the new energy vehicle industry, which has further clarified the status of the new energy vehicle industry in the development of the automobile industry, and has matched more financial subsidy policies related to the new energy vehicle industry.In addition, as shown in Table 1, Anhui Province has also made clear and specific requirements for public vehicles, updated new energy vehicles in municipal administration, sanitation, tourist attractions, ports and airports (excluding emergency vehicles), postal services and logistics distribution in various areas of the province.Various forms of policy support have become the unique advantage of the development of new energy industry cluster in Anhui Province.

Table 1. Requirements for new and updated new energy vehicles in the public domain

operational environment	region	The proportion of new energy sources in newly added and updated vehicles
utility car	Hefei, Wuhu downtown area	Starting from 2021,100% shall be approved by the competent authorities except under special circumstances
	Other areas	From 2021, no less than 80%
Municipal administration, sanitation, tourist attractions, ports and airports (excluding emergency vehicles)	Hefei, Wuhu	From 2021, no less than 80%
	other cities	No less than 50% in 2021,60% in 2022, and less than 70% in 2023
Postal service, logistics and distribution	cities	No less than 50% in 2021,60% in 2022, and less than 70% in 2023

B. Market house

As the world's largest and fastest growing Chinese automobile market, China's demand for new energy vehicles is very strong.According to relevant data, in 2016, the national total vehicle sales of about 28 million, of which new energy vehicles accounted for more than 500,000.In the first half of 2017, the cumulative production and sales of domestic new energy vehicles were 212,000 and 195,000 units, respectively, up 19.7% and 14.4% year-on-year.In 2021, the national sales of new energy vehicles is 3.512 million, with a year-on-year growth of 160%. The share of new energy vehicles in the national automobile market is constantly rising, and the growing demand for new energy vehicles is also the advantage of the development of Anhui new energy vehicle industry cluster.

C. A person of ability

The development of new energy industry cluster cannot be separated from the support of talents. The vehicle engineering major of Hefei University of Technology is second to none in China, and the

perfect industry-university-research system has made a great contribution to the development of the automobile industry in Anhui Province.At the same time, Hefei University of Technology has set up a new major related to new energy vehicles, and enrolled 200 students for the first time, which has improved the senior talent reserve for the development of the new energy vehicle industry cluster in Anhui Province.In 2017, universities and enterprises in Anhui province released more than a dozen scientific research and experimental products about the new energy vehicle industry through cooperation, and the industry-university-research institute of the new energy vehicle industry was further deepened.

3.2 Disadvantage analysis

A. Technology

For the production of new energy vehicles, battery production technology is the key, and energy density is the core technology index of kinetic energy battery.China's research and development of new energy vehicle batteries started relatively late.At present, the domestic new energy vehicle battery also has two obvious problems, one is the domestic new energy vehicle battery life relative to low foreign new energy vehicles, the second is in low temperature conditions such as extreme environment, new energy vehicle battery life and service life will be seriously affected, reduce the battery life and endurance.The above problems are all resistance to improving China's new energy vehicle battery technology, breaking the current technical difficulties and promoting the development of Anhui new energy vehicle industry cluster.China's new energy vehicle enterprises will be in a catch-up stage in a long time, a short time can not make a substantial breakthrough in, which has also become a restrictive factor restricting the development of Anhui new energy vehicle cluster.Secondly, enterprises in developed countries in Europe and the United States pay more attention to product quality and technology research and development from the early stage of growth, which is also the reason why developed countries in Europe and the United States maintain the leading technology in the field of new energy vehicles.In the early stage of growth, Chinese enterprises aim to expand their scale and seize their market share. Only in the middle and late stage of enterprise growth will they pay attention to the investment of product quality and technology.This also restricts the development of the new energy vehicle industry cluster in Anhui province and even the whole country.

B. Infrastructure

As the infrastructure for the development of new energy vehicle cluster, charging pile also has an important impact on the development of Anhui new energy vehicle industry cluster.The charging pile facilities in Anhui province and even the whole country need to be further improved. There are insufficient supporting parking Spaces matching with the charging piles, and the regional distribution of charging piles is uneven, which is still a big gap with the goal of one car and one charging pile.All this has restricted the development pace of Anhui new energy vehicle industry cluster. If we want more consumers to choose new energy vehicles, it is necessary to bring the convenience of charging pile charging to new energy vehicle users.

C. Supervision mechanism

The problem of new energy vehicles has been constantly exposed, which has become a major event of great concern in the current automobile industry.As we all know, in recent years, in order to promote the development of China's new energy vehicle industry, the national and local governments of Anhui Province have continuously increased the promotion of new energy vehicles, with frequent favorable policies.But some new energy vehicle enterprises fabricate the number of production and sales of new energy vehicles to apply for government subsidies.New energy automobile enterprise fraud behavior caused the government subsidies failed to implement, let those who really need money to develop technology of new energy automobile enterprises cannot get money, will eventually lead to new energy automobile technology without quality breakthrough, product quality can not improve, competitiveness is not strong, makes the new energy automobile industry cluster in Anhui province development is limited.Secondly, consumer trust is an important support for the development of new

energy vehicle enterprises and even the whole industry. The safety performance of new energy vehicles affects the choice and recognition of new energy vehicle consumers in Anhui province, and it is also an important factor to obtain the trust of consumers.

All the above problems should be considered by the Anhui Provincial local government in the process of promoting the development of the Anhui new energy vehicle industry cluster, which requires a perfect supervision mechanism and reward and punishment mechanism, so as to promote the healthy development of the new energy vehicle industry cluster in Anhui Province.

3.3 Opportunity analysis

A. requirement

With the improvement of people's living standards and the continuous progress of the national ecological and environmental protection work, the concept of environmental protection is deeply rooted in people's hearts, and the concept of green and low-carbon travel has been more and more recognized.In addition, compared with traditional vehicles, new energy vehicles have lower energy consumption and cost, and are more and more favored by consumers.According to Table 2, new energy vehicles are significantly better than traditional fuel vehicles in terms of energy consumption and carbon emissions.In addition, the potential market size of new energy vehicle finance has reached tens of billions of yuan, which is a blue ocean market with huge potential for both auto finance companies with manufacturer background and third-party auto finance platforms with traffic advantages.

Table 2. Comparison of carbon emissions per 100 km of traditional fuel vehicles and new energy vehicles (in MJ / 100KM, KG / 100KM)

index	Traditional cars	New energy vehicles
energy consumption	219MJ/100KM	91MJ/100KM
carbon emission	793KG/100KM	16.25KG/100KM

B. oil price

Ukraine conflict caused soaring international oil prices, at the same time, domestic oil prices are affected by the international oil price rise, since 2022,92 gasoline and 95 gasoline five rose, 95 gasoline into 9 yuan era, lead to traditional fuel travel costs further, and many fuel car owners or potential car consumers will turn to the consumption of new energy vehicles.

According to the basic principles of economics, within a certain range, the higher the price, the product sales will decrease, the price of gasoline will rise, and the sales of fuel cars that are complementary to gasoline will also be negatively affected.New energy vehicles are an alternative to traditional fuel vehicles, and their maintenance costs and operating costs are also lower than those of traditional fuel vehicles. Therefore, in the background of rising oil prices, the sales of new energy vehicles will rise.

3.4 Threat analysis

At present, all countries in the world attach great importance to the development of new energy vehicles, and spare no effort to promote the development of their own new energy vehicles.For example, Tesla, Toyota and other international established automakers have been working in the field of new energy vehicles for many years, and have great technical and resource advantages.However, China's new energy vehicle industry started late, lagging behind the international famous new energy vehicle enterprises in the development and application of new energy vehicle technology, battery digital management and monitoring system.It is also at a relative disadvantage in the international competition.

4. Strategic choice of Anhui new energy industry cluster development

4.1 SO strategy analysis

The cluster development of new energy vehicle industry in Anhui Province has advantages in terms of policies, markets and talents, and there are certain opportunities under the background of rising demand and rising oil prices. The development of new energy vehicle industry cluster in Anhui Province needs to effectively rely on internal advantages and take advantage of external opportunities.That is, seize the opportunity, take advantage of the advantage.

In the context of carbon neutrality, the public is more and more recognized by the concept of low carbon travel, and the willingness of green travel is becoming stronger and stronger. Anhui Province can take green energy conservation and environmental protection as the marketing focus, expand the marketing of new energy vehicles, and build a brand for the development of Anhui new energy vehicle industry cluster.At the same time, on the basis of continuing to implement the new energy vehicle cluster development support policy, certain subsidies can be given to consumers who buy new energy vehicles, so as to further stimulate potential consumers to buy new energy vehicles.On the one hand, it can expand the market share of new energy vehicles and provide a good market foundation for the development of new energy vehicle industry cluster in Anhui Province.On the other hand, the expansion of the market share of new energy vehicles can improve the operating income of new energy vehicle enterprises, further alleviate the capital pressure of r & d investment of new energy vehicle enterprises, promote new energy vehicle enterprises to increase research and development investment, and improve the competitiveness of new energy vehicles in the market.

4.2 ST strategy analysis

The cluster development of new energy automobile industry in Anhui province has advantages in terms of policy, market and talent, and has threats from industry enterprises in terms of competitiveness.The development of new energy vehicle industry cluster in Anhui province needs to rely on internal advantages and overcome external threats.

Anhui province can, as always, give policy support for the development of new energy industry cluster, and promote the in-depth cooperation between schools and enterprises, to provide strong talent support for the development of Anhui new energy vehicle enterprises and Anhui automobile industry cluster.At the same time, deepen the "double recruitment and double introduction" policy, attract the majority of domestic and foreign new energy enterprises to develop in Anhui province, improve the number and quality of Anhui new energy vehicle enterprises.And through the automobile enterprise cluster to build Anhui new energy automobile industry cluster, through the new energy automobile industry chain, expand the capital chain, activate the creation chain, shape the common interests of Anhui new energy automobile enterprises, enhance the cohesion between Anhui new energy automobile enterprises, enhance the competitiveness of Anhui new energy automobile enterprises.

4.3 WO strategic analysis

The cluster development of the new energy vehicle industry in Anhui province has disadvantages in technology, infrastructure and supervision, but there are certain opportunities under the background of rising demand and rising oil prices.The development of new energy vehicle industry cluster in Anhui province needs to change the internal weakness through external opportunities, that is, seize the opportunity and overcome the disadvantages.

Under the background of rising demand for carbon neutral and new energy vehicles, enhance consumers' confidence in buying new energy vehicles, enhance the market share of new energy vehicles, and provide power for Anhui to build a new energy vehicle industry cluster.At the same time, Anhui new energy vehicle industry cluster development should also seize the opportunity to overcome their own disadvantages.On the one hand, through strict standards to eliminate backward technology, low product quality of new energy vehicle enterprises, and then improve the level of the

whole new energy industry.On the other hand, in order to solve the problem of insurance fraud of many new energy vehicle enterprises, it is necessary to strengthen the information supervision of new energy vehicle enterprises and reduce the insurance fraud caused by information asymmetry.For example, number the key components of new energy vehicles, and control the whole process of research and development and manufacturing of key components of new energy vehicles.It can also establish the credit archive of the new energy vehicle subsidy enterprises to reduce the problem of the information difference between the government and the car enterprises.Before the government subsidies, through the screening of the integrity of the archives, reduce the occurrence of new energy vehicle enterprises insurance fraud.

In addition, we can also strengthen the punishment of insurance fraud, and increase the illegal cost of enterprise insurance fraud.Seize the opportunity, overcome the disadvantages, and promote the development of the new energy vehicle industry cluster in Anhui Province.

4.4 WT strategic analysis

The cluster development of new energy vehicle industry in Anhui province has disadvantages in technology, infrastructure and supervision, and there are also threats from industry enterprises in terms of competitiveness.The development of the new energy vehicle industry cluster in Anhui province needs to reduce the internal disadvantages of enterprises and overcome the external threats.

Anhui new energy enterprises have the problem of low battery life in battery technology, so it is necessary to support enough charging piles while improving battery technology.Increase the investment in the research and development of technologies related to charging piles, and reduce the charging time of new energy vehicles.A unified standard for charging piles should be established, and consumers should freely switch between various charging facilities to improve the charging efficiency of consumers and make up for the imperfect infrastructure.So as to overcome the disadvantages in the development of the new energy vehicle industry cluster.Promote the mutual cooperation and common development of the new energy vehicle industry in Anhui Province, reduce the evil competition in the same industry, promote the development of the new energy vehicle industry cluster in Anhui Province, and promote the promotion of competitiveness.

In addition, a fair and orderly market competition mechanism can be established, the quality supervision system can be improved, the product competitiveness can be enhanced through the dual means of supervision and market, and the external threats can be overcome to promote the development of the new energy vehicle industry cluster in Anhui Province.

5. The conclusion

The development of new energy vehicle industry cluster has become an inevitable trend of the development of China's new energy automobile industry. Anhui Province should seize the historical opportunity of the great development of new energy vehicle industry and promote the development of Anhui new energy automobile industry cluster.This paper analyzes the advantages, opportunities, disadvantages and threats of the neV cluster development in Anhui Province through SWOT analysis.Research found that in Anhui province can new automobile industry source cluster development, policy, market and talent advantage, in the new energy vehicle demand and oil prices have certain opportunities, but disadvantages in technology, infrastructure and regulation, and the threat from external industry of new energy automobile enterprises.On this basis, the SO strategy analysis, ST strategy analysis, WO strategy analysis and WT strategy analysis were further conducted on the development of the new energy vehicle industry cluster in Anhui Province.Under the analysis of SO strategy, the development of Anhui new energy vehicle industry cluster needs to seize the opportunity under the background of rising demand for new energy vehicles and rising oil prices, and give full play to its own advantages in policy, market and talent.Under the analysis of ST strategy, the development of Anhui new energy vehicle industry cluster needs to rely on the internal advantages in policies, markets and talents to overcome the external competitive threat brought from

internationally renowned new energy vehicle enterprises.Under the analysis of WO strategy, the development of new energy vehicle industry cluster in Anhui needs to seize the opportunities under the background of rising external demand for new energy vehicles and rising oil prices, and change the disadvantages in technology, infrastructure and supervision.Under the analysis of WT strategy, the development of Anhui new energy vehicle industry cluster needs to reduce the internal disadvantages in technology, infrastructure and supervision of enterprises, and the external competitive threat brought from internationally known new energy vehicle enterprises.

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