An Analysis of Chongqing New-Energy-Automobile Industry Innovation from the Perspective of Regional Innovation

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Keywords: Chongqing, New-Energy-Vehicles, Regional Economy, Regional Innovation, Cultivating Policy.

Abstract. This paper took the new-energy-vehicle demonstration city, Chongqing as an example, combined spatial economics and the relevant theory of regional innovation, analyzed Chongqing key new-energy-automobile data in five years, including the basic situation of new-energy-automobile enterprise, regional investment, and enterprise innovation output, summarized the general picture of the current Chongqing regional innovation, and industrial technology direction, etc. Based on the analysis of the data, this paper demonstrated the feasibility of Chongqing new-energy-automobile industry innovation, combing the unique advantage of regional industry innovation, thus pertinently put forward guidance policy to promote Chongqing local new-energy-automobile industry innovation cultivation, to provide the corresponding reference for the local economic development.

1. An Innovative Background in the Era of Energy Control of Automobile Industry

1.1 A profile of the new-energy-automobile industry innovation network in China

From the basic development of auto industry, new-energy-vehicles do not significantly impact the basic interests chain of the traditional automobile, but they have obvious difference compared with the traditional fuel vehicles, under the condition of complete technical conditions in the future new-energy-vehicles will become the core of the industry market rather than the small segment of the current embarrassing situation, they not only conform to the trend of the time, also meet China’s current demand of the social and environmental development [1]. The future changes in consumer demand for new-energy-vehicles can further promote the expansion of market segment, thus new-energy-vehicles industry in a certain sense also belong to a kind of creative industries.

From the macroscopic policy perspective, China put forward the major program of electric car since 2001 (Ministry of Science and Technology published “‘863’ plan of electric cars, major program”), launched a new incentive policy in new-energy-vehicles development planning almost every 1 to 2 years. “The development planning of energy saving and automobile industry 2012-2020” more clearly put forward the government’s vision and goals for the development of new-energy-automobile industry, it also showed national policy at this stage focused on the energy control and environmental protection, new-energy-vehicles are catered to the policy requirements, in accordance with the development of the time.

From the basic demand of industrial innovation - the own technology by the end of 2016, China’s application for a patent of a hybrid car is close to 6400 pieces, but accounts for only 4% of global patent applications, its application for a patent of pure electric vehicles is close to 4000 pieces, but only 13% of similar applications worldwide, and its application for fuel cells, less than 3000 patents, accounting for less than 2% of the world [2]. Compared with those countries of higher patent ownership (Japan, the United States, South Korea, Germany, UK), our similar patent growth is more significant, since 2011 the average annual growth rate of China’s new-energy-vehicle patent is over 15%, close to the world’s highest level [3]. Given the highly international characteristics of
modern production, our country has a relative sound basis of industry development. From the segmentation of the market development, the overall growth of China’s new-energy-automobile market is good, especially after 2010, having a rapid growth in China’s new-energy-automobile production and sales.

On the whole, the innovation network of China’s new-energy-automobile industry has been formed, and industrial innovation is possible. In similar research, most innovative research is based on the analysis of the basic elements of innovation network, but few researchers have a segment analysis of the overall innovation of new-energy-automobile industry from the perspective of the regional economy innovation, this article will take Chongqing as an example, adopting the idea of regional industry innovation and development to have a comprehensive analysis of cash flow, the formation of industry chain, and the maturity of technology chain, a more complete analysis of the present situation of Chongqing new-energy-automobile industry innovation.

1.2 The necessary conditions for the development of new-energy-automobile industry in the regional economy

Space economics theory holds that the accumulation and development of the industry can lead to asymmetric resources, industry innovation provides the necessary conditions for asymmetric resources, and regional innovation will get the unique superiority, such as the high efficiency of elements supply within the region and sharing quality of knowledge, etc. [4], therefore producing very good effect on the regional economic development. And the development of regional economy also emphasizes regional innovation, which advocated strategic industries choices to better locate economic development strategy [5], in accordance with the basic guidance of resource dependence theory, providing reliable, effective and sufficient resources of industrial development, in order to drive regional economic development through strategic emerging industry [6].

From this perspective, the new-energy-automobile industry, as a type of innovative industries, has positive significance for regional economy development, is the optimization goal of local government in a strategic industry fostering, but the support of the industry needs external resources, including the financing environment, centralized configuration of resources and environmental policy planning, etc. At present most domestic study of regional economic development focused on the space economy, relatively fewer discussion of a single industry, even in a single industry research more focus is on the capital level, lack of comprehensive study of technology and innovation, this article will combine the technology-intensive characteristics of new-energy-automobile, focusing on the indicators of technology and innovation of Chongqing new-energy-vehicles, a more accurate summary of optimization of local innovation industry development.


2.1 The development profile of Chongqing new-energy-automobile industry

The current situation of Chongqing new-energy-car industry mainly focused on fund resources and resource allocation. Among them, the number of innovative enterprises has continued to grow, and the volume of regional funds has been gradually increased and the number of innovative technological output has significantly increased. By the end of October 2016, the statistics were as follows:

Business development. There are 31 new-energy-automobile enterprises in Chongqing, with a total registered capital of RMB 11.1 billion, accounting for 4.7% and 3.4% of the country’s new-energy-automobile enterprises and the total registered capital respectively. The number of enterprises in the country ranks fourth, with more than 10 billion yuan registered capital. From 2006 to 2010, the number of new enterprises was the largest, at 13; the second period is between 1996 and 2000, the new-established companies are 6. The number of companies founded between 2011 and 2015 was the lowest, at just one. Chongqing new-energy-automobile industry chain includes the automobile enterprise, battery enterprises, motor, electric control and after-sale service
enterprises, among them, the vehicle number and registered capital are the most, 15 and 9.02 billion yuan respectively, accounting for 48.4% and 81.3% of the total number of Chongqing new-energy-automobile enterprises and of the total amount of the registered capital.

Investment flow characteristics. From 2011 to October 2016, Chongqing new-energy-vehicle enterprises have invested 43 times, with a total contribution of 3.54 billion yuan, having a net outflow of industry investment. From the point of the industry chain, the foreign investment entity of Chongqing new-energy-vehicles enterprises mainly concentrated in the vehicle enterprises, the number of its contribution is 31, the total amount is 2.8 billion yuan, accounting for 72.1% and 79% respectively.

Technical development. From the technology patent application, the annual public patents of Chongqing new-energy-automobile industry in 2006-2006 were 4717, of which 2009-2013 patent technology development was the fastest (respectively 658, 574, 659, 700, 829). The patent applicants are mainly companies and individuals (ratio of 51%, 42 RMB), a few researchers in colleges and universities and research institutions (4%, 3%), the applicants for key patents are mainly from Changan, Huachen, and Lifan group and their subsidiaries.

2.2 A summary of the present situation and an analyses of the capacity of industry innovation

From the point of view of perfection of industry chain, in the development of regional industry, the chain maturity is very important, which has been fully confirmed in the development of traditional fuel vehicle industry in China, Shenyang in the mature conditions of the industry chain realized the rapid development of the auto industry. The overall development of Chongqing new-energy-automobile industry chain is relatively intact, including the vehicle enterprises, battery, motor, electric control enterprises and after-sale service enterprises, among which, the number of vehicle enterprises and the registered capital are the most. The key difference of new-energy-automobile industry chain and traditional fuel vehicle industry chain is the key technical parts supply, which has been almost solved in Chongqing. This shows that Chongqing is relatively expert at resources allocation of new-energy-vehicles innovation industry, and it can also provide favorable conditions for the rapid allocation of resources.

From the point of investment development, at present the total foreign investment of Chongqing new-energy-automobile enterprises is 43 times, with a total amount of 3.54 billion yuan, having a net outflow of industry investment. This reveals that Chongqing new-energy industry investment is mainly on external investment, and its essence is to introduce the capital accumulation of its own technology, and accelerate the speed of accumulation. But from the point of view of regional industry innovation, the development of creative industries rely on internal and external investment at the same time, external investment is implemented by the advantage resources of external complement, while internal investment is used in the improvement of the competitive market and the maintenance of innovation, and is not conducive to the development of technology talents of the internal industry, the investment environment of Chongqing new-energy-automobile industry for internal investment is not friendly, which needs to be urgently addressed.

From the point of technology development, the patents of Chongqing new-energy-automobile enterprises have been rapidly growing since 2005, the enterprises as the main body of innovation, make up about 51% of the patent applicants, with a majority of the patent for utility model, accounting for 50% of the total new-energy-car key enterprises. Chongqing Changan new-energy-automobile ranks first in technology and innovation, embodies the guiding direction of the development of Chongqing new-energy-vehicles. From another perspective, in the development of the local new-energy-automobile industry, except for the dominant vehicle manufacturing group and its affiliated enterprises, the number of other key technology enterprises was fewer and technology competition environment has not yet formed, which is not conducive to the construction of regional industry alliance, for the long-term development, the knocked-out developing drive of internal sustainable competitive power is relatively scarce. Of course, at this stage it does not yet present a significant impact, which is because the domestic industry is still at an early stage of
development, and regional competition (mainly between the famous OEM manufacturing firms) is still significant, but currently the development of Chongqing new-energy-automobile favors a certain regional advantage, which will continue to expand in the future, since internal development power will rely more on regional technology competition, thus the industry innovation in the area also needs to pay attention to the optimization of technology competition environment.

Overall, the development of Chongqing new-energy-vehicles industry trend is good, with a complete industry chain, having a good fusion of technology chain under the new demand, and a powerful industrial development. Combining with the local reality, the local government is perfecting the new-energy-automobile industry development and market development, the statistics from the local government show that by the end of 2015, the cumulative running days of Chongqing local new-energy-vehicles were 873717 days per vehicle, a total of 255 ac charging pile (1300 fast/slow charging pile under construction), from 2014 to 2015 in public transportation field replacement of new-energy-vehicles was more than 700 units (mainly for the bus, accounting for 39.8% of the total update bus). Therefore, the development of the new-energy-automobile industry in Chongqing is relatively good in its own development and policy orientation, and the innovation environment is in good condition. But from the continuing advance of regional innovation, there are still some problems in Chongqing, one is the relative low proportion of internal investment, another is the uneven distribution of internal technology development, and both are not conducive to the optimization of internal competition, also can produce certain obstacles to the development of professional technical personnel.


According to the above analysis of the regional innovation power of Chongqing new-energy-automobile industry, the overall performance is good, but there are still some problems in the optimization of the investment environment and technology development, this paper puts forward the following three suggestions for reference.

3.1 To optimize the regional investment environment

The optimization of internal investment environment can focus on the two key points, one is the optimization of financing channels in research and development technology and production technology for small and medium enterprises, to optimize the development of such enterprises through policy incentives, to provide a better environment for the coordination and configuration of local resources, to reduce over-reliance of the top enterprises on external investment [7], but also to promote local employment structure, and promote the reasonable growth of talents. Another is geared to the needs of industry comprehensive development and the optimization of investment strategy, pointing to the rapid development of local innovation industry, introducing external funding to accelerate the development of local innovation industry [8], in the short term, the local development is difficult to achieve rapid economic growth of supporting industries through internal and external investment, we can provide more favorable policies to attract capital inflows, accelerating the molding speed of innovation industry.

3.2 Strengthen the development of regional professionals to promote technological balance

From the previous analysis we found that Chongqing new-energy-automobile technology mainly centers in advantage group enterprises, social individuals, talents of colleges and universities, scientific research institutions also have nearly half the non-key technology, but the technology balance is significant. Fundamentally, this is because the enterprises have higher input costs under the stimulus of new energy automobile market, also have higher talent development power, while the government and research institutions in this respect attaches less importance, it also led to the insufficient delta of emerging enterprises in the industrial technology. To solve this problem, the best strategy is to build strategic talent development and policy on the basis of industrial innovation.
target [9]. Firstly, department of education should guide the local colleges and universities to perfect the system of the professionals and technical personnel as soon as possible, then the governmental departments provide good strategies to attract urgent-needed talents (such as social welfare, the household registration, base salary limit, etc.), to attract professional talents as far as possible, for the development and growth of the middle and lower enterprises in the supply chain provide the necessary conditions and perfect the balance of technology.

3.3 To improve the policy of equity and encouragement

The unfairness of both investment environment and technical environment is fundamentally due to the imbalance of policy tendency, which is inevitable in the adjustment of the local industrial structure, the risk control needs of early industrial innovation will inevitably require the government policy be more inclined to high-maturity, large-scale enterprise [10]. But from the sustainability of regional innovation, strategic industrial innovation cannot be entirely dependent on individual enterprises, which can lead to deformity of industrial development. Reasonable industrial strategy innovation needs ensure a balanced development of the core industry and affiliated industry, local government can further provide perfect, fair incentive policies for new-energy-vehicles industry and affiliated industry (energy production and supply, transportation service enterprise, computing and web service technology companies, etc.), and further improve the regional innovative resource aggregation.

4. Conclusion

In regional innovation, this article had an integrated analysis of cash flow, the industry chain and the technology chain, reveal a whole picture of the current situation and direction of Chongqing new-energy-vehicles technological innovation, in order to reflect the difference between the new-energy-vehicles and conventional cars, the introduction of indicators of the new-energy-automobile technology focus and technology innovation is used to reflect optimization ability of the development of new-energy-vehicles, Chongqing was found to have a fine new-energy-automobile industry innovation ability. But at this stage, we still have some obstacles in Chongqing new-energy-automobile industry innovation, this paper puts forward three policy suggestions, respectively open internal investment, professional development and incentive equity to further strengthen resources gathering and optimize the regional healthy competition, for the continuous dynamics of the regional industry innovation to provide effective conditions.

Reference


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