

Innovation in Government Guidance Models for Strategic Emerging Industries

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Abstract: China's strategic emerging industries have made considerable progress in terms of playing an important role in economic development, adjusting industrial structure, and stabilizing economic growth since the 12th Five-Year Plan period. However, there are still some problems such as a lack of core technology, an inequitable allocation of resources, an inadequacy of institutional mechanisms, and delayed supporting facilities. In the 13th Five-Year Plan period, China must innovate the support policies for strategic emerging industries by changing the traditional "government-led" development model and establishing a "market-led government guidance" development model. Overall, China should use innovative management tools to improve the strategic emerging industries' governance system and promote innovation capacity construction, thereby to boost the development of strategic emerging industries in China.

Keywords: strategic emerging industries; government guidance; innovation governance system; innovation capacity; innovation management tools

1. General development situation of strategic emerging industries

China's strategic emerging industries have developed rapidly since the State Council issued the *Decision on Speeding up the Cultivation and Development of Strategic Emerging Industries*. Multiple breakthroughs in the key technologies of certain fields create regional cluster trends. The improving policy environment and maturing market have influenced the key forces of the structural adjustment, transformational mode, and provision of benefits, which significantly drive the long-term development of society and the economy.

1.1. Strategic emerging industries that develop rapidly become the key force in driving economic growth

During the 12th Five-Year Plan period, various provinces and cities were positively engaged in the development of strategic

emerging industries. Although the main economic indicators, including GDP growth, industry value added, and fixed-asset investment growth, declined, the strategic emerging industries still developed rapidly, leading to a great increase in the total industrial economies of scale. The strategic emerging industries have already become the main driving force of innovation while also playing an increasingly important role in stabilizing growth and transforming the economy. In 2015, the growth of the seven strategic emerging industries including energy-saving and environment-friendly industry, emerging information industry, biotechnology industry, new energy industry, new-energy vehicles industry, high-end equipment manufacturing industry, and new-type materials industry was twice the GDP growth. The percentage of value added by strategic emerging industries to the GDP was almost 8%. Despite the unfavorable economic situation, the strategic emerging industries have largely become the primary growth factor and key support of the regional economy.

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1.2. Breakthroughs in key technologies of some fields become the main driving force of industry development

During the 12th Five-Year Plan period, breakthroughs in key technologies of strategic emerging industries fostered their development; many are world-class technologies. For example, China's new-generation information technology (IT) industry is an established world leader. In January 2014, TD-LTE-Advanced was officially declared compliant to 4G international standards by the International Telecommunications Union, which is one of the two international standards. Further, there is constant development in the technology system of railway transportation equipment. The advancement of the Chinese Train Control System (CTCS) is due to the availability of core technological equipment and a localization rate of over 80%. The high-speed railway technologies and products in China are already the best in the world. With improving interurban railway technologies, new technologies such as urban railway transit, are being constantly developed and utilized.

1.3. The emergence of industrial cluster strength and projects effectively promote the marketization process

Regional pilot clusters of strategic emerging industries were conducted in 2012 and 2014 in four provinces, including Guangdong, Jiangsu, Anhui, and Hubei, as well as the city of Shenzhen. The results show that the industrial clusters promoted breakthroughs in the key fields of some regions. Various regions promoted landmark construction projects and allocated resources for establishing an industry model to increase corporate innovation capabilities and promote industrial cluster development.

1.4. Constant improvement in policies stimulates the market and industry

During the 12th Five-Year Plan period, China gradually published special plans for key fields. Some ministries announced a batch of pertinent policies to offer tax privileges, encourage, and guide private enterprises to develop emerging industries. The strategies provided a sound policy environment for the development of strategic emerging industries. The specialized strategies of the seven emerging industries prompted the ministries, including the Ministry of Science and Technology, the Ministry of Industry and Information Technology, and the National Development and Reform Commission, to release various technological development policies for segmented fields. Various provinces and cities successively released planning or guidance information to stimulate the vitality of industry and market.

1.5. Constant commercial innovations promote the development of the modern service industry

New technologies and new industries continue to merge each

other, particularly promoting the innovation of new business models based on the "Internet plus platform" and the emergence of customization, "Internet Plus" public entrepreneurship, and other new business models [1]. The shared business model of new energy vehicles has also made rapid development. The use of the "electric vehicle separation, double locking windows, combined charge-dimensional" model by bus operators has achieved success in Shenzhen. The rapid development of China's energy and environmental protection services, along with the swift progress in contract energy management, environmental services contract, energy saving supermarkets, and other such business models, has greatly promoted the development of the energy-saving and environmental protection industry.

2. Problems in the development of strategic emerging industries

During the 12th Five-Year Plan period, China's strategic emerging industries developed quickly; however, there are still some problems that the industries face, such as a lack of core technology, an inequitable allocation of resources, inadequate system controls, and delayed supporting facilities, which restrict the cultivation and development of strategic emerging industries.

2.1. Due to a lack of domestic innovation, some key technologies are owned by foreign countries

Although there have been breakthroughs in the technologies of certain fields, China's strategic emerging industries include few core technologies. Further, developed countries obtain patents and core technologies from some of the emerging industries in China, and China must still import key equipment. The innovating enterprises insufficiently emphasize product R&D and mostly duplicate technologies from other enterprises instead of conducting independent R&D activities. The common factors, such as the lack of core technologies, intellectual properties, and self-owned brands, retain the emerging industries at the low end of the value chain. Finally, inconsistent in industrial development, such as "high-end industry, low-end link, repeated construction, low-level competition," severely restricts the development process and level of China's strategic emerging industries.

2.2. Scattered resource allocation is responsible for the deficient industrial ecological system

China's strategic emerging industries face the common problem of numerous small enterprises with low innovation capabilities. The benefit of the economies of scale is low because there are few large enterprise groups and leading enterprises with international competitiveness. For example, the scales of biological enterprises are usually small, and the limited number of large biological enterprises significantly restricts China's innovation

capabilities. Moreover, domestic enterprises typically engage in product integration and application, which is the downstream of the industry chain. However, developed countries strongly maintain the upstream core technologies and system integrations. The lack of industry chains in some fields delays coordinating various links and supporting services which limits favorable cluster and industrial development.

2.3. Delayed system reform hinders the development of strategic emerging industries

Delayed management system reforms in some fields obstruct the development plans of some strategic emerging industries. The contradiction between the new economy and the old system is evident in industries such as biological medicine (gene detection) and new-generation IT (Didi Dache). The establishment of emerging industries from technology and industry integration must be supported by various other fields. Therefore, a platform must be established to support the development of emerging industries.

2.4. Revamping the price system and financial support policies will improve the environment for development

Enterprises in strategic emerging industries usually provide high value-added products, leading to significant labor input and a small deduction of value-added tax. For value-added tax, the taxation system restricts the development of emerging industries to a certain extent. Thus, the national subsidy policies must be improved. For example, the subsidy policies for new energy automobile favor product technology path. Therefore, enterprises could pursue the subsidies for the product design process while neglecting the market demand. Moreover, financial institutions have weak motivation to provide strategic emerging industries with financial services. The traditional loan systems of banks are not suitable for the main industry structure of strategic emerging industries, where many small and professional enterprises are scattered. The banks mainly provide credit support to big enterprises, and financing remains a significant concern among small and medium-size enterprises (SMEs) in strategic emerging industries.

2.5. A weak platform for common technology in industries will delay facilities development

In recent years, most of China's industries lack common technology R&D institutions. The lack of common technology R&D and the scattered bases and platforms render the industries with insufficient service capabilities. A common and leading technology R&D platform requires a resource allocation system and constant resource input to satisfy the demand of key industrial independent innovations. Further, the inadequacy of common

technology R&D restricts China's industrial structure adjustment and upgrading, and national industry competitiveness. For example, due to the shortage of high-end equipment manufacturing technology innovation infrastructure, numerous key R&D activities and experiments cannot be conducted independently. The low equipment engineering level and production ability of supporting materials require China to import equipment, which increases product cost. Moreover, the product performance and stability is not uniform, and the technology standard system is outdated compared to the industry development. Additionally, this insufficient infrastructure also influences the connection between the products and markets of strategic emerging industries.

3. Policy suggestions for transferring government macro-guidance mode

To combat the problems strategic emerging industries encountered during the 12th Five-Year Plan period, the government should change the guidance mode of strategic emerging industries to speed up the development of the strategic emerging industries in the 13th Five-Year Plan period. There are several specific methods, which include carrying out technological innovation and system innovation, setting up a scientific innovation government system, enhancing innovation ability in construction, and promoting innovation in government implementations [2].

3.1. Establish a scientific and comprehensive innovation governance system

3.1.1. Enhance the top-level design of policies for strategic emerging industries

The Fifth Plenary Session of the 18th Communist Party of China Central Committee decided to "construct the new industry system, speed up the construction of manufacturing power, and cultivate a number of strategic industries". The connection and coordination among different national policies should be processed from a national strategic top-level design. For example, these national strategies such as "strategic emerging industries," "Made in China 2025" and "Internet Plus," should support and advance with the development strategies of the strategic emerging industries, so that they can provide a new platform and opportunity for their formation and development of strategic emerging industries.

3.1.2. Finalize relevant legislations for development of the strategic emerging industries

It is important to complete the *Laws of Promoting the Commercialization of Scientific and Technological Achievements of the People's Republic of China*, and to promote the formation of special laws for the commercialization of scientific achievements, such as *Laws for the Businesses Launched by National Scientific Researcher* and *Laws for the Trading of Technological Property Rights*. The legislation for big data and Internet secu-

riety is necessary for the new-generation IT field. Laws for the *Promotion and Standardization of Biological Industry Development* are required for the biological medicine field. China must construct and finalize the legal guarantee system, efficient patent approval system, and the perfect intellectual property protection system for the development of the biological industry.

3.1.3. Create a sound market environment and initiate system innovation

First, China must broaden and simplify the administrative approval system and reduce the direct government resource allocation. The administrative approval for activities that can be effectively adjusted by the market system should be discontinued. For example, the evaluation and approval system for national drug and medical equipment must be improved. With the establishment of a speedy approval system, China can contribute to the global industrialization of biological medicine. Second, China should promote the construction of an adaptable industry monitoring system. The system reforms that cannot adapt to the development of strategic emerging industries should be reformed to guarantee the development of emerging industries. For example, the restrictions on Didi Dache and the access control for low-speed electronic motors should be removed. Third, the restriction to accessing private capital and the investment restrictions on private capital for strategic emerging industries should be released. Certain links of new energy and new-generation IT industries should be allowed to be funded by private capital or the public-private partnership (PPP) mode to encourage a crucial private channel for traditional industries to invest in strategic emerging industries [3].

3.1.4. Establish a comprehensive financial and tax support system

First, China should enhance its financial and tax policy support. Financial policies include special funding and financial subsidies that are direct investment modes, and loans with discounted interests and guarantees that are indirect investment modes. These policies should be released to enhance financial policy support for strategic emerging industries. The tax policies for strategic emerging industries should reduce the tax, increase the popular tax policies, including a greater deduction for R&D cost, guidance for enterprises to increase R&D input, and the promotion of social capital. Second, innovations should be introduced to utilize the central financial fund. A business investment guidance fund should be established for strategic emerging industries, and the government should provide social investment and support for the rapid development of innovative SMEs. In addition, a risk compensation system should be established and the financial institutions must be urged to increase their financial support to strategic emerging industries. Third, innovations in financial service procedures should be introduced. Specifically, open finance, including combined financial products, should be

encouraged; support for the strategic emerging industry cluster, traditional industry cluster, and commercialization of scientific achievements should be enhanced; financial support policies encouraging innovation and the acceptance of failure should be formulated; and, finally, the tolerance for financial risk for open finance and policy finance should be increased.

3.1.5. Promote the innovation ecological environment for industrial development

The formation of development policies for strategic emerging industries must be based on the industrial chain structure. China should consider the combination of relevant support industries, emerging and traditional industries, as well as technological exchange and industrial collaborations among emerging industries to significantly develop the third party institutions and to promote innovations in the ecological environment for the development of strategic emerging industries.

3.2. Promote the development of the innovation ability of strategic emerging industries

3.2.1. Effectively focus on the basic R&D of strategic emerging industries and enhance the construction of a common technology platform

First, based on the forecasted industry and technological development trends, China should closely follow the key global technological breakthroughs and innovations, give full play to the strength of central finance, and focus support in fundamental, strategic, leading scientific research. Second, China should promote a national key R&D plan, model applications using the chain design from fundamental and key common technologies, and accelerate the permeation and guidance of the latest achievements to the downstream innovation industry. Third, for the R&D and system integration of key technologies, China should give full play to the role of the enterprises and R&D institutions to introduce national common technology platforms of shared resources by the market operation system. Additionally, the national key scientific research infrastructure sharing system should be developed, and the local government must construct a public service platform for strategic emerging industries.

3.2.2. Construct the industry-university-research-use cooperation system and technology transfer system

First, an industry-university-research-use cooperation system must be formed; the relationship between the enterprises and universities must be enhanced, and the latest scientific research achievements must be organically connected with market demand and application. Direct support policies, and the responsibilities, rights, and benefits in the industry-university-research cooperation and the open cooperation mode of the complemented strengths must be defined, and a clear division of responsibility, shared achievement, and shared risk should be

implemented. Second, a multi-level technology (property right) trading market system should be developed; a technology transfer center must be promoted; patent operation procedures and patent transfers should be upgraded and implemented; and innovation achievement commercialization, transfer, and application must be hastened. Third, the ownership system of scientific research achievements should be comprehensively reformed and the ownership information of technological achievement should be released. Further, the transfer of scientific research achievement from the system should be promoted, such that the system transfer benefits stimulates scientific researchers to develop technologies with more application value, explores and promotes a system that utilizes the scientific research elements from the market, and stimulates the vitality of technology innovation.

3.3. Make comprehensive use of a scientific innovation governance tool

3.3.1. Construct a statistic indicator system for strategic emerging industries

China must effectively develop regulations for technologies, markets, and industries and apply methods, including an evaluation indicator system and maturity evaluation, to objectively reflect the development of strategic emerging industries, forecast future development trends, and provide references to the government and enterprises for the further selection, formation, and development of advantageous industries. Based on the maturity evaluations, China should release relevant support and stimulus policies, provide key support and impetus to industries with low

market maturity, and release additional policies to promote the fast development of industries with high market maturity.

3.3.2. Utilize leading analysis tools for technology forecast

Scientific methods should be used to forecast the development trends of strategic emerging industries, and China should impart the complete scope of roles to the experts and think tanks in all fields. By cooperating with industrial departments, universities, and research institutions, our country can scientifically select key technologies of strategic emerging industries and reasonably review the leading technologies of strategic emerging industries. According to the technology analysis of big data, China can forecast the development trends of leading technologies through the technology roadmap and patent analysis. Additionally, China should also focus on subversive innovation generated from the development trend and integration of new technologies and new fields, emphasize the collaboration and connection of cross-industry technologies, and complete the ecological system of innovation.

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