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Exploring the Mechanism of Regional Innovation Factors Driving the Upgrading of High-Tech Industrial Chains

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Abstract: The healthy development of high technology industry is an important strategic support for China to achieve economic take-off, and the rapid upgrading of its level is an important way to realize the effective integration of innovation chain and industrial chain. To this end, this paper explores the development history of China's high-tech industrial chain in song and explores the five-in-one resource factor guarantee system based on technological innovation input, innovation output application, marketization level, investment capacity and government policy support, which provides clearer suggestions for the further upgrading of China's high-tech industrial chain.

Keywords: Regional innovation factors; High-tech industrial chain upgrading; Interaction mechanism.

1. Introduction

China is currently facing a complex external competitive environment and the domestic and international economic situation is complicated and severe, which puts forward new requirements for the extended development level of the industrial chain at the present stage in China. As an emerging industry that drives the high-quality improvement of national economy, high-tech industry is an important carrier to promote industrial upgrading power innovation and seize the international innovation highland. Based on this, China has proposed an innovation-driven development strategy to further promote the great idea of extending the high-tech industry chain. The traditional industrial chain extension refers to the expansion of the already well-built industrial chain to both ends, which reflects a vertical thinking and includes the extension of the industrial chain in both upstream and downstream directions, while the fierce industrial competition situation at home and abroad today requires us to pay attention not only to the vertical extension level of the industrial chain, but also to the quality of the industrial chain extension, and to enhance the economic value of the industrial chain extension in all aspects and from many angles. This puts forward higher requirements on the efficiency of the extension of China's industrial chain.

High-tech industry chain extension is to take key node enterprises as the main extension body in a specific region, through strengthening the value distribution linkage of industrial collaboration, and based on the endogenous chain progression logic and multiple types of resource elements to enhance the structure level and economic contribution capacity of high-tech industry chain, and promote further optimisation and upgrading of high-tech industry. The essence of the efficiency of high-tech industry extension is that the industries in the region gradually break through their own development boundaries and strengthen the rate and level of expansion of the boundaries of the extension of the high-tech industry chain in the region by expanding the various types of resource elements available [1]. From this, it can be seen that high-tech industrial chain extension can be guaranteed by increasing the input of resource elements to improve the efficiency of chain extension. Among them, based on the exploration of the efficiency of high-tech industry chain extension can effectively measure the siphon effect formed by technological progress, which includes the optimization of chain structure, efficiency improvement, development quality improvement, economic value contribution and other aspects. Therefore, at the critical moment when innovation factors are driving the upgrading and development of high-tech industries as a whole, how to measure the extension level of high-tech industrial chains at the present stage in China, and how to achieve the improvement of the efficiency of high-tech industrial chain extension by adjusting the guaranteed combination path of various innovation resource factors is a practical problem that needs to be solved urgently.

2. Literature review

In terms of the resource elements affecting the extension of high-tech industrial chain. For internal resource factors, existing scholars mostly focus on the influence of resource factors such as innovation input, patent output and enterprise management capacity on the extension of high-tech industrial chain, among which technological innovation input is the main source of funds for technological upgrading activities of enterprises in high-tech industrial chain. In the existing research on technological innovation inputs and the development of high-tech industrial chain extension, scholars have found that high-intensity technological innovation inputs can more efficiently stimulate the innovation activities of enterprises in high-tech industrial chains, accelerate the process of technological upgrading and achieve the goal of innovation-driven industrial economic development. Some studies have also shown that patent output is the leading driver of high-tech industrial chain extension, and that efficient application of innovation output can drive the structural upgrading and contribution of high-tech industrial chains in a more sustainable manner. In addition, some scholars have pointed out that the effect of internal resources in driving the development and extension of high-tech

industrial chains is closely related to the attributes, scale and location of enterprises in the chain [2]. As for external resources, scholars have focused more on the impact of capital investment, government support and the level of marketization on the upgrading of high-tech industrial chains. Theoretically, long-term capital investment and government support are the external realistic reasons for the innovation practices of enterprises in high-tech industrial chains. The profit-seeking characteristics embodied in the marketisation of enterprises' products make external resource factors automatically increase their investment in economically efficient frontier technology innovation areas, which in turn drive the structural optimization and economic contribution of high-tech industrial chains [3]. In the existing studies on the development of high-tech industrial chains by external resource factors, most scholars tend to compare the mechanism of capital investment capacity and government policy support on the upgrading of high-tech industrial chains, and find that high-quality capital investment efficiency has significant effects on the upgrading of high-tech industries through expanding financing channels and other means, while government support mainly accelerates the evolution of high-tech industries through realistic measures such as policy tilting and tax incentives [4]. The government support mainly accelerates the evolution of high technology industry chains with practical initiatives such as policy tilts and fiscal incentives [4]. In addition, some scholars hold the opposite view that excessive support from external guaranteed resources is not conducive to the autonomy of high-tech industrial chains and is prone to pioneering inertia [25]. The findings of the above scholars may have some variation, perhaps influenced by the regional economic development environment, the strength of scientific research, the level of technological innovation or the degree of government attention and other realistic background.

3. Analysis of the mechanism of regional innovation factors driving the upgrading of high-tech industrial chain

3.1. Technological innovation input intensity and upgrading of high-tech industrial chains

The intensity of technological innovation investment plays an extremely important role in improving the efficiency of the extension of high-tech industrial chain. First of all, the enterprise subjects in the chain gradually increase the capital investment in the "neck" frontier technology innovation in the high-tech field, which can provide solid financial support for the realization of technological innovation, alleviate the exogenous risk of technological blockade, increase the effective output of application-oriented technological innovation activities (invention patents), and further enhance the efficiency of the vertical and However, the extent to which such input effectiveness is realised is still affected by the scale of input, input industry preference, regional innovation capacity and other realistic factors[5]. Secondly, a high level of innovation input intensity will accelerate the innovation synergy effect of multiple actors in the high-tech industry chain, and the clear innovation input direction of the chain master enterprises will shorten the time for supporting industries such as SMEs to identify the "direction of technological breakthrough" and help them achieve more efficient output. Ultimately, the significant increase in the efficiency of the extension of the structure and output of the high-tech industry chain will lead to an increase in the efficiency of the extension of its contribution, thus expanding the overall scale and economic benefits of the high-tech industry chain.

3.2. Innovation output application validity and innovation output of high-tech industry chain upgrading

Innovation application validity can significantly contribute to the improvement of the efficiency of the extension of high-tech industrial chains. Companies in the chain with higher innovation application validity also have higher innovation output and breakthroughs in key core technologies; likewise, their own innovation results are significantly higher than those of companies with lower innovation application validity. Innovation application organizations, mainly science and technology business incubators, already have a complete "pre-transformation screening + post-transformation management" "pre-transformation screening + post-transformation management" mechanism. Pre-transformation screening + post-transformation management" mechanism for the application of innovation results. Before transformation, the main organizations, such as technology business incubators and enterprises, usually select high-level technological achievements with high economic added value (e.g. high technological leadership and products that meet mainstream market demand) for transformation. Accelerating the efficiency of the transformation of innovation results helps to promote technology business incubation, enlarge the scale of high-tech industry development and contribute to the efficiency of the extension of high-tech industry chain structure [6]. After the transformation of innovation achievements, with the successful incubation of science and technology enterprises, the micro-component structure of the high-tech industrial chain is somewhat optimized, and the products of science and technology enterprises begin to rapidly fill the market gaps, compensate for the lack of supporting products in the high-tech industrial chain, alleviate the risks of the supply chain development of the industrial chain, further promote the release of the economic contribution capacity of emerging science and technology enterprises in the high-tech industrial chain, and guarantee the efficiency of the extension of the economic benefits of China's high-tech industrial chain Rapidly enhance the efficiency of the extension of China's high-tech industry chain. At the same time, the flourishing development of enterprises in the high-tech industry chain will improve the effectiveness of the application of innovation results, effectively increase the frontier technology content of the high-tech industry chain, gradually widen the market share and narrow the technological gap with developed economies. The degree of Innovation output is the key result of technological innovation in the industrial chain, and its practical application validity can reflect the level of impact of innovation results on the efficiency of industrial chain extension to the greatest extent.

3.3. Capital investment capacity and the efficiency of high-tech industry chain extension

Capital investment is an important financial guarantee for

the improvement of the efficiency of high-tech industry chain extension. However, there is still no uniform understanding of the impact of capital investment on the improvement of the efficiency of high-tech industry chain extension. The traditional view is that liquid capital in the market is more willing to supply capital to low-risk industrial chains [7]. The increase in efficiency of high-tech industry chain extension is usually accompanied by high risks, and capital investment agents will raise the investment threshold due to risk-averse considerations. Therefore, low capital investment capacity will, to a certain extent, hinder the improvement of the efficiency of the extension of high-tech industrial chains. However, a review of existing research shows that some scholars have pointed out that, based on the perspective of competitive ability, long-term competition among capital investment subjects can help improve their capital investment ability and enhance their ability to resist investment risks, which indirectly promotes the improvement of investment in high-tech industries and further enhances the efficiency of industrial chain extension. At the same time, combined with life cycle theory research, in the late stage of the development of the efficiency of high-tech industrial chain extension, i.e. the stage of application of innovation results and industrialization of technological products, the scale of industrial chain development gradually expands, the capital demand gap becomes larger, and the risk resilience improves significantly, so the process of high-tech industrial chain extension will have a higher probability of obtaining capital investment and further improving the quality of extension. Based on this situation, the improvement of capital investment capacity will positively promote the efficiency of the extension of high-tech industry chain. The stronger the capacity of capital investment, the more abundant the source of capital for the extension of the industrial chain.

3.4. Government support and efficiency of high-tech industrial chain extension

By constructing a policy environment system covering land, taxation, capital and talent support, the main government body enhances the intensity of policy support to significantly promote the total output value of the high-tech industry chain, the scale of R&D investment and the degree of gap market filling, further promoting the efficiency of the extension of the structure of the high-tech industry chain and the extension of the degree of contribution. Excessive support is not conducive to the innovation performance and overall business capability of technology enterprises, and the development of the industry chain will not be able to adapt to the increasingly competitive environment. In reality, the policy environment covering all elements is strongly influenced by the level of regional economic development and government policy planning. At the same time, the threshold and cost of government support for enterprises in the high-tech industry chain are low. As long as the enterprises have high-tech attributes, cutting-edge technology and high growth core elements, they will receive comprehensive, multi-disciplinary and deep-level policy support from the government, which will accelerate the transformation of the main enterprise technology and the realization of economic benefits, and further promote the efficiency of the extension of the high-tech industry chain [8]. The government's policy support can be more targeted and efficient to further enhance the efficiency of the extension of high-tech industry chain. As government support increases, the efficiency of industry chain extension will also increase accordingly.

3.5. The level of marketization and the efficiency of high-tech industry chain extension

The level of marketisation significantly affects the change in efficiency of the extension of high-tech industrial chains. The marketization process of high-tech industrial chain needs the support of core enterprises with competitive technology, while the development of enterprises needs the support of core products with strong market share. A moderate level of marketisation will significantly facilitate the process of innovation activities in high-tech industrial chains, enhance the ability of operating entities to prevent market risks, and in turn enhance the profitability-driven economic contribution of high-tech industrial chains. At present, if the development of high-tech industrial chains is in an environment of insufficient marketisation and inadequate competition, it will lead to poor market sensitivity of science and technology enterprises, and it will be difficult for product production to take into account the trend of the times and the needs of consumers in the market; once multi-subject enterprises in high-tech industrial chains find that certain highly marketable products have achieved great economic benefits, they will inevitably turn to them, regardless of the scale of the enterprises, for the sake of enhancing economic added value In the long run, this will gradually lead to the emergence of a high technology industry. In the long run, this will lead to the homogenization of high-tech products, intensified packaged competition, a further deterioration of the market environment and a reduced desire for technological innovation, which will seriously hinder the improvement of the structure of the industrial chain and the efficiency of its extension in terms of contribution. The state of the high or low level of marketisation will significantly affect the changes in the efficiency of the extension of high-tech industrial chains.

4. Conclusion

Based on the results of the study, the following policy recommendations are made to rapidly enhance the efficiency of the extension of China's high-tech industrial chain.

In accordance with the realistic needs of the country to solve major technological challenges, consider the realistic situation of high-tech industry chain extension in each region, formulate regional high-tech industry chain synergistic development strategies, accelerate the construction of a complementary chain mechanism for the east, central and western high-tech industry chains to complement each other's strengths and a strong chain mechanism for win-win cooperation, and strive to form an excellent situation of advanced leading the backward and synergistic progress at an early date; at the same time, subjects at all levels should clarify their own rights, responsibilities and benefits, from At the same time, subjects at all levels should clarify their rights, responsibilities and benefits, and formulate long-term plans and long-term development strategies for the extension and efficiency enhancement of regional high-tech industrial chains at all levels from the national to local governments, break down geographical boundaries, actively promote various forms of technological innovation and application exchanges in various provinces and regions, and form a complementary mechanism led by the market and guided by

the government; increase investment in the introduction of advantageous high-tech industries, improve the production and supporting links of regional high-tech industrial chains, and Gradually improve the efficiency of the extension of high-tech industrial chains in the region; moreover, ensure that regions with low extension efficiency are given favorable policies on finance, taxation, technology and talents, so as to form as soon as possible a new pattern of bringing the West with the East, promoting the Middle with the East, and making concerted progress in the East and the West.

Accelerate the construction and perfection of a new mechanism to improve the efficiency of the extension of high-tech industrial chain with technological innovation and application as the main body, market demand as the guide, policy as the guarantee, and industrial optimization and upgrading as the goal of the deep integration of government, industry, academia, research and use of gold. It is necessary to strengthen the leading position of each innovation subject in the region, further clarify the technology and market demand for the extension of high-tech industry chain within the region, increase the strength of investment attraction and policy support for high-tech industries in advantageous regions, actively change the service concept service, and further improve the path of innovation investment-led condition grouping with the mutual cooperation of technology innovation investment and investment attraction capacity; focus on constructing the market-oriented mechanism of resource elements The market-oriented flow mechanism of resource elements is being developed to enhance the efficiency of innovation, capital and talent in the process of extending the high-tech industrial chain; the service system for enhancing the efficiency of the extension of the high-tech industrial chain is being accelerated to build a comprehensive system of innovation subjects, capital and policies to achieve a multi-element combination driven by the key link of enhancing the effectiveness of the application of innovation output and the auxiliary elements of capital investment capability, government support and market-oriented level.

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