Research on the Institutional Mechanism of Promoting Beijing-Tianjin-Hebei Collaborative Innovation

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Abstract. Beijing-Tianjin-Hebei collaborative innovation is an advanced stage of Beijing-Tianjin-Hebei collaborative development, and is an important manifestation and core force of regional collaborative development in the new era. Under the new situation, with the deepening of the national innovation-driven development strategy, promoting the formation of a collaborative innovation community and building a collaborative innovation mechanism have become the key initiatives to promote the high-quality collaborative development of Beijing-TianjinHebei in the new era. This paper firstly discusses the status quo, development significance and problems of Beijing-Tianjin-Hebei collaborative innovation, clarifies the top-level logical structure of Beijing-Tianjin-Hebei collaborative innovation mechanism, so as to further clarify the goal, structure and operation mechanism of constructing Beijing-Tianjin-Hebei collaborative innovation community, and puts forward the corresponding policy suggestions to optimize the development path of promoting Beijing-Tianjin-Hebei collaborative innovation, so as to provide a reference for further enhancing the level of collaborative innovation in Beijing-Tianjin-Hebei and pushing the development of collaborative innovation to a higher level. The development of collaborative innovation in Beijing-Tianjin-Hebei will be pushed to a higher level and achieve common prosperity.

Keywords: Beijing-Tianjin-Hebei region; Collaborative Innovation Mechanism; Toplevel Logic; Optimisation Path.

1. Preface

1.1 Background and significance of topic selection

1.1.1 Background of the selected topic
The geographical connection of Beijing-Tianjin-Hebei region is an important economic and development region in China, which has the conditions for mutual integration and coordinated development. According to statistics, in 2022, the regional GDP of this region has reached 10,029.27 billion yuan, and the economic development speed is relatively fast, with an increase of 2.0% compared with the previous year and 1.8 times that before the coordinated development of Beijing-Tianjin-Hebei. In addition, the Beijing-Tianjin-Hebei region still has great potential for coordinated development, so it needs to play a leading role in demonstration. In order to further promote the development of this region, in 2014, the government put forward a national strategy to promote the coordinated development of Beijing-Tianjin-Hebei, and in 2015, the Outline of Beijing-Tianjin-Hebei Coordinated Development Plan was adopted, which provided guidance for promoting the construction of Beijing-Tianjin-Hebei Collaborative Innovation Community.

Although some achievements have been made, the gap between the internal and external development of Beijing-Tianjin-Hebei region is quite large, and there is no basis for collaborative innovation. The total economic output of Beijing-Tianjin-Hebei region has been decreasing year by year, from 10.07% in 2015 to 8.28% in 2022. This is because under the traditional administrative division system, the uneven distribution of innovation elements, low mobility of resources and insufficient innovation ability have restricted the development of Beijing-Tianjin-Hebei. In fact, the economic development of Beijing-Tianjin-Hebei region is facing some problems, such as the huge gap in economic development levels, the uncoordinated industrial structure and the lack of convergence between innovation chain and the industrial chain. In addition, the coexistence of local protection barriers and the lack of market vitality is also an important problem. In order to solve these
problems, Beijing-Tianjin-Hebei region urgently needs to build an institutional mechanism to promote collaborative innovation and development, and improve the innovation path, which will help promote the coordinated development of different regions' economies, so as to achieve healthy and stable economic growth and sustainable development of the whole region and inject new vitality and motivation into economic development.

1.1.2 Significance of topic selection

In recent years, the coordinated development of Beijing-Tianjin-Hebei region has become a significant national strategy with symbolic significance. Among them, collaborative innovation, as one of the important ways and core issues of the coordinated development of Beijing-Tianjin-Hebei, not only is conducive to promoting the high-quality development of the region, but also realizing the transformation of economic kinetic energy, promoting the innovation-driven region to achieve more balanced and sustainable coordinated development, and injecting new impetus into the development of Beijing-Tianjin-Hebei region.

In the process of transformation and upgrading of traditional industries, promoting Beijing-Tianjin-Hebei collaborative innovation development is conducive to accelerating the deep integration of Beijing-Tianjin-Hebei industrial chain and supply chain, forming a synergistic agglomeration effect of innovative resources, realizing the sharing and optimal allocation of innovative resources, accelerating the flow of factors, narrowing the development gap, improving production efficiency and accelerating the transformation and promotion of innovative achievements through refined collaborative innovation cooperation, which is conducive to achieving sustained economic growth; As the core area of national strategy, Beijing-Tianjin-Hebei region has the advantage of attracting talents. By strengthening the construction of innovation and entrepreneurship ecological environment, building high-quality scientific research platforms and business incubation bases, we will create a first-class innovation and entrepreneurship ecology and attract more high-end talents to come to innovate and start businesses. These talents will bring innovative ability and entrepreneurial experience, and promote the coordinated innovation and development of Beijing-Tianjin-Hebei region; It is conducive to the formation of a Beijing-Tianjin-Hebei collaborative innovation community with clear goals, orderly flow and optimized configuration, and is also the key to promoting the development of collaborative innovation; It is conducive to sorting out the regional innovation policy system, establishing clear development goals, and establishing a good policy coordination mechanism to make innovation policies flow orderly between different regions; It is conducive to optimizing the allocation of innovative resources, ensuring the efficient use of resources and realizing the organic combination of innovative forces in various places.

1.2 Research content and innovation

1.2.1 Research contents

Collaborative innovation of Beijing-Tianjin-Hebei is one of the major strategies for China's economic development at present. In order to discuss its system problems in depth, this paper has carried out systematic research based on collaborative innovation and other theories. Through comprehensive reference to the existing literature, a theoretical framework of Beijing-Tianjin-Hebei collaborative innovation mechanism is made in order to better integrate all resources and promote innovation and development. In the aspect of research path selection, this paper makes an in-depth study from the perspectives of cross-region, cross-subject and cross-factor. We find that Beijing-Tianjin-Hebei collaborative innovation needs targeted and operable path selection to ensure the maximization of results. Therefore, we put forward some concrete measures and suggestions, such as strengthening cross-regional cooperation, promoting cross-subject cooperation and optimizing cross-factor allocation, so as to promote the development of collaborative innovation in Beijing, Tianjin and Hebei.
1.2.2 Research methods, characteristics and innovation

① This paper sorts out, sorts out and refers to the high-level papers published by some experts and scholars at home and abroad, and draws a more systematic and comprehensive system diagram of Beijing-Tianjin-Hebei collaborative innovation through comprehensive consideration.

② Based on the factor analysis method, this paper analyzes various factors that affect the development of collaborative innovation in Beijing-Tianjin-Hebei region in combination with the actual situation, and makes in-depth research on the system, mechanism and path selection of collaborative innovation in Beijing-Tianjin-Hebei region in combination with multi-perspective and multi-agent, so as to make it more targeted and operable.

2. Literature review

2.1 Research status

For the construction of the collaborative innovation system in Beijing-Tianjin-Hebei region and the analysis of the current situation based on data analysis, Zhao Chengwei and others[1] based on the triple helix theory and proximity theory, built a collaborative innovation mechanism of "one goal, two-wheel drive, three subjects, four-party government and five synergies" from two dimensions of the collaborative relationship between innovation subjects and the spatial correlation between regions; Zhang Shiyun et al[2] based on the theory of synergy and innovation network, based on the interactive relationship between foundation, subject, element, carrier and industry, constructed the analysis framework of regional collaborative innovation; Zhai Ruirui and others[3] combine entropy method, entropy weight method, gravity model and social network analysis to present the status quo of Beijing-Tianjin-Hebei collaborative innovation from two dimensions: between macro-urban agglomerations and within micro-Beijing-Tianjin-Hebei; Herry Liu[4] based on the analysis of innovation output data in Beijing, Tianjin and Hebei, analyzes the synergistic development effect among various innovation subjects in the region; Zhuang Tao[5] uses the triple helix algorithm based on mutual information to empirically test the coordinated innovation of Beijing-Tianjin-Hebei region from two aspects: the coordinated development of research subjects and the correlation between regions; Based on the theoretical model of radiation and leading effect in Beijing-Tianjin-Hebei region, Sun Yukang and others[6] made an empirical study on the radiation-leading effect of Beijing's technological innovation in the region after the integration of Beijing-Tianjin-Hebei. Liu Bin[7] takes Beijing-Tianjin-Hebei region as an example, taking regional collaborative innovation and growth as the research object, and analyzes the mechanism of coordinated development in Beijing-Tianjin region on enterprise innovation and national overall economic development; Zhu Erjuan and others[8] established the index system of regional collaborative innovation in Beijing, Tianjin and Hebei from four aspects: collaborative foundation, collaborative behavior, collaborative effect and collaborative environment, and made a comprehensive evaluation.

With regard to the relevant measures to promote collaborative innovation in Beijing-Tianjin-Hebei region, Yan Tingbiao[9] clarified the goal, system structure and operation mechanism of building a collaborative innovation community in Beijing-Tianjin-Hebei region from the perspective of target positioning, key nodes and differentiated needs; Bo Wenguang[10] believes that the government should carry out top-level design at a reasonable government level, take the positive actions of the three governments as a breakthrough point, establish an efficient and collaborative cooperation carrier, support the overall role of non-governmental organizations, and promote multi-party cooperation and various measures together; Li Xiaolin and others[11] proposed to make full use of the competitive advantages of the three places to achieve coordinated development among regions; The Beijing-Tianjin-Hebei Cooperation Development (2021) Summit Forum[12] put forward the new trend of Beijing-Tianjin integration development, that is, developing digital economy and building a world-class digital economy industrial cluster; Dong Shugong[13] regards the construction of credit system as an important guarantee for the development of regional economic integration in Beijing, Tianjin
and Hebei, and its main contents include cooperative innovation subject credit, dynamic credit and result credit; Ye Tanglin and others[14] think that there is a big gap in innovation level among Beijing, Tianjin and Hebei, and there is a lack of regional innovation chain. It is necessary to optimize the allocation of innovation chain with key industrial chains as the center to achieve high-level collaborative innovation.

2.2 Literature review

At present, there have been a lot of studies on the evaluation of collaborative innovation ability in Beijing and Tianjin, but systematic and thematic studies on its mechanism are rare. Some path choices are not even in line with the actual national conditions of Beijing and Tianjin, and are not conducive to the actual needs of economic and social development in Beijing and Tianjin. The major task of Beijing-Tianjin regional collaborative innovation construction urgently needs to put forward more detailed and operable concrete measures from the legal and institutional levels in view of the actual situation in Beijing and Tianjin.

3. Collaborative innovation mechanism in Beijing-Tianjin-Hebei region

3.1 Theoretical basis

3.1.1 Regional collaborative innovation theory

The so-called "region" refers to a series of "spatial units" artificially divided on the surface according to specific scientific research, life and administration. The basic idea of synergetics theory is that large-scale systems are composed of subsystems, and their contradictions and conflicts can be effectively reduced through mutual interaction and cooperation. To this end, the core of cooperation lies in the construction of coordination relations and behaviors, resource interaction, information feedback and other means to achieve common goals, to simplify procedures and reduce costs. Promoting the circulation and cooperation of innovative resources between different regions and different subjects is the fundamental purpose of promoting regional cooperation.

3.1.2 Innovation network

"Innovation network" was first put forward by Freeman[15] in 1991. It is an important mechanism for government, universities and enterprises to jointly participate in institutional innovation. It is an organizational form of cooperative innovation by multiple participants, and an integrated regional innovation network is formed according to network nodes, node relationship chains, innovation resources and innovation atmosphere. At present, the theory of regional innovation network based on localization highlights the collaborative communication within the network and its dependence on the environment, and it is stable and open.

3.2 Mechanism analysis

The establishment of Beijing-Tianjin-Hebei regional collaborative innovation system is an important measure for the development of Beijing-Tianjin regional integration, and it is also the key to promote the efficient circulation of regional innovation elements in the region and space. Based on collaborative innovation, innovation network and other related theories, this paper constructs the theoretical framework of Beijing-Tianjin-Hebei collaborative innovation mechanism from multiple perspectives (Figure 1).

Innovation foundation is the cornerstone of regional cooperative innovation, and its core content includes policies and regulations, institutional mechanisms and regional development level, and based on top-level design and regional development level, it promotes high-level integration, optimizes government game, urban-rural overall planning, regional balance and other issues; Taking cooperation as the center and universities, governments, enterprises and financial research institutes as the main targets, a complex network structure is formed through cooperation in all aspects, which promotes the cooperation among innovation subjects and optimizes the allocation of innovation
resources; Coordinating knowledge, technology, talents, capital, finance, information, equipment and other elements is an important part of innovative resources, which is beneficial to prevent the waste of resources, reduce repeated allocation, make innovative resources transform in different fields, and promote the circulation and sharing of various innovative elements; Carrier co-construction is the basis for the circulation and sharing of resources, mainly including scientific research institutions such as scientific research institutions and laboratories, application carriers such as park bases, industry alliance associations and network platforms, and all parties cooperate with each other; By jointly building various platforms, industrial synergy promotes the combination of industrial chain, innovation chain and supply chain, promotes the development of traditional industries and emerging industries, especially “high-tech” industries, and promotes regional cooperation.

Figure 1: Theoretical framework of Beijing-Tianjin-Hebei collaborative innovation mechanism
4. Exist Problem

① The development of innovation in Beijing-Tianjin-Hebei region is unbalanced, the radiation effect in Beijing is insufficient, the allocation of resources is seriously unbalanced, the integrity and consistency of collaborative innovation community are still very poor, and its structure, function and correlation are still in the initial stage, which is still far from the goal of "strengthening scientific and technological research and improving the overall efficiency of China's innovation system" of the 20th National Congress of the Communist Party of China.

② The collaborative innovation in Beijing-Tianjin-Hebei region has not yet established a normal operation mechanism, lacks in-depth research, effective collaborative innovation concepts and internal motivation, and the integration degree of its key areas and links is not enough, and the ability of innovation to drive regional collaborative development is poor;

③ The collaborative innovation policy in Beijing-Tianjin-Hebei region often overlaps with finance, industry and administration, so it is difficult to implement it effectively at the level of cross-regional cooperation, which leads to the generalization of the policy.

5. Enlightenment from development experience

① Building a Beijing-Tianjin-Hebei collaborative innovation network

Focusing on the development of surrounding areas driven by radiation, we will focus on promoting the construction of xiong'an new area, Tianjin Binhai New Area and Shijiazhuang, strengthen the cultivation of regional central cities, and form a new collaborative and innovative development pattern with reasonable structure, gradient distribution and division of labor. With modern collaborative innovation as the link, the innovation chain and industrial chain in Beijing-Tianjin-Hebei region, which are closely related among diversified subjects, will be established to form good interaction and function.

② Improve the communication system of innovation diffusion

Focusing on "innovative highland", we will enhance the ability of inland areas to absorb and transform innovative resources, so as to form a good interaction. Tianjin and Hebei should closely absorb Beijing's superior R&D resources, improve the mechanism of undertaking, supporting and transferring industries, and promote the transformation and landing of Beijing's innovative resources in the region.

③ Establish a sound industrial development system

To build a modern industrial system, we should optimize the industrial structure, increase investment in technology research and innovation, strengthen the convergence and cooperation of Tianjin-Beijing industrial chain through scientific and technological innovation services, form a closer industrial link network, promote the development of traditional industries in the direction of high-end and intelligence, and increase the added value of industries; Focus on promoting the development of emerging industries, provide more economic growth points, give full play to the advantages in scientific and technological services, build a collaborative innovation service system with strong radiation across administrative regions, and strengthen cooperation and exchanges with Tianjin, Hebei and surrounding areas by using Beijing's rich scientific research resources and innovative elements to jointly enhance the ability of scientific and technological innovation; It is necessary to establish a joint research platform for innovation teams and scientific research institutions, strengthen the transformation and popularization of scientific and technological achievements, and provide more high-quality scientific and technological services for enterprises in Tianjin and Beijing; The development of modern service industry is an important symbol of urban development and a new driving force for economic growth. Collaborative innovation should be taken as the starting point to promote the deep integration of modern service industry and advanced manufacturing industry, and the modern service industry and advanced manufacturing industry in Beijing, Tianjin and Hebei should be closely combined to realize the complementarity of resource
Advantages and the perfection of industrial chain. By integrating the professional service resources of the three places, we can provide more comprehensive and personalized services, improve the core competitiveness and innovation ability of enterprises, and enhance the ability of Tianjin and Hebei to undertake Beijing industries.

④ Focus on different needs

Beijing-Tianjin-Hebei region has significant regional differences in technical characteristics and great differences in innovation demand. Beijing is the national science and technology center, with abundant innovation resources and strong creativity. Its innovation requirement is to attract the best technology and talents in the world here, vigorously develop high-end industries and build an important scientific and technological innovation highland in the world. Tianjin, as a national advanced manufacturing R&D base, will intensify the research and development of high-end manufacturing industries and accelerate the scientific and technological progress of key industries; As a national industrial transformation and upgrading experimental zone, Hebei should gradually form and strengthen leading industries, take leading industries as a breakthrough to enhance core competitiveness, promote regional development, and improve the level of technology transfer, transformation and innovation. In-depth research on the coordinated innovation and development of Beijing-Tianjin-Hebei region needs to focus on the different requirements of technological innovation in Beijing-Tianjin-Hebei region, promote the joint research of industrial technology, the establishment of strategic alliances and the cooperation of strategic emerging industries, reduce cooperation resistance and enhance endogenous motivation.

⑤ Deepen the multi-benefit sharing mechanism

The current administrative system, financial system and performance evaluation system are still the key to restrict the development of Beijing-Tianjin regional economic integration. Different innovation regions and subjects have different interest demands, so it is necessary to study different collaborative innovation methods to achieve multiple interest demands and win-win results. We should reform the cooperation mode of multi-stakeholders and explore the development model of innovation chain, industrial chain and ecological chain in Beijing-Tianjin-Hebei region on the basis of benefit sharing innovation. Realize multi-party active participation in creative planning, strategic consultation and industrial design; Expand market planning and other aspects, and explore diversified and diversified collaborative innovation.

⑥ Study and promulgate targeted collaborative innovation policies

In the process of coordinated development of Beijing-Tianjin region, there are still problems such as low professionalism and operability of coordinated policies. Therefore, it is necessary to formulate and introduce targeted policies to promote collaborative innovation, as well as supporting measures in related industries, regions and intellectual property rights to enhance the innovation vitality of the region. It is necessary to take the regional economic integration of Beijing, Tianjin and Hebei as the main line, study the industrial guidance and support measures, minimize the overlapping, duplication and conflict of policies from the aspects of policy subjects, objects and means, and achieve coordination and consistency at the level of policy recipients and improve the consistency of policies. Through comprehensive consideration of various aspects, we can reduce the inefficiency and contradictions caused by decentralization, improve the integrity of the policy system, and timely introduce support measures at different levels, scales and fields in view of existing problems and conflicts, so as to overcome the current "absence" phenomenon of promoting cooperative innovation and enhance the synergistic effect.

6. Summary

As the most dynamic region in northern China, Beijing-Tianjin-Hebei is located in the hinterland of East Asia, which has a broad space for coordinated development. The integration of Beijing-Tianjin-Hebei is a main way and the ultimate goal of coordinated economic and social development in the new era, and the coordinated innovation and development of Beijing-Tianjin-Hebei has
important practical significance for promoting the integrated development of Beijing-Tianjin-Hebei. In order to promote the coordinated innovation development of Beijing-Tianjin-Hebei region, it is urgent to study and form a specialized regional collaborative innovation system, establish a network system of policies, industries and innovations, optimize the innovation diffusion mechanism in the region, focus on different demand focuses, deepen the promotion of the overall coordinated innovation development of Beijing-Tianjin-Hebei region through a multi-benefit sharing mechanism, and help the macro-development of Beijing-Tianjin-Hebei region. It is expected that the level of coordinated innovation and development of Beijing-Tianjin-Hebei will be significantly improved in the future, and the high-quality coordinated development of Beijing-Tianjin-Hebei integration will be effectively promoted.

References


