

# Research on Strategies to Promote the Integration of Industrial Chain, Innovation Chain, and Supply Chain in the Beijing-Tianjin-Hebei Region

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**Abstract:** With the rapid development of international economic integration, industrial competition has gradually evolved from a competition of enterprise capabilities and resources to a game of comprehensive system collaboration capabilities among all participating parties. That is, the competition in the current international economy has evolved into an interactive and collaborative competition among the “three chains” of industry chain, capital chain, and innovation chain. Based on analyzing the current situation of the integration of the industrial chain, innovation chain, and supply chain, this article deeply analyzes the geographical advantages of the three chains in the Beijing-Tianjin-Hebei region. From the perspective of scientific and technological innovation and talent cooperation synergy, it proposes the integration strategy of the three chains in the Beijing-Tianjin-Hebei region.

**Keywords:** Industrial chain; Innovation chain; Supply chain; Beijing-Tianjin-Hebei; Spatial distribution

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## 1. Introduction

Due to differences in the distribution of raw material resources, industrial manufacturing technology, technological innovation capabilities, and product production capacity, as well as the fluidity of resources, in the context of rapid global economic integration, no country can independently produce products that fully meet the personalized needs of its own people. This has led to the optimization and configuration of the industrial chain on a global scale. However, the ever-changing international economic situation and the crude intervention of international politics in economic industries have posed serious challenges to the security of industrial chains, innovation chains, and supply chains.

To further promote the implementation of the Beijing-Tianjin-Hebei coordinated development strategy, it is necessary to elevate the integration of industries in the region to a certain level, which is also an urgent problem to be solved in the current economic development. Although geographically adjacent to Beijing and Tianjin, Hebei has not enjoyed the dividends generated by the advantages of Beijing and Tianjin in the process

of upgrading and transforming traditional industries, which is closely related to the degree of integration of industries in the Beijing-Tianjin-Hebei region. In the context of the new development pattern of “dual circulation” in the country, it is necessary to fully leverage the driving role of technological innovation in sustainable economic development. China is vigorously promoting the innovation-driven strategy. Given that the Beijing-Tianjin-Hebei region combines its own characteristics and undertakes different tasks and functions in the three chains, it is necessary to match its advantageous resources within the internal system of the region according to the goals and requirements of the three chains.

Due to the significant differences in regional development advantages of the Beijing-Tianjin-Hebei region, there are significant differences in the allocation of industrial resources and innovation factors. Beijing is a political and cultural center with massive scientific and technological strength, which can inject lasting vitality into the development of the Tianjin Hebei region, drive the integration and development of the “three chains” in the region, and promote the transformation and landing of industrial innovation achievements. It plays an important role in achieving industrial upgrading and transformation, cultivating new economic growth points, and guiding the Beijing-Tianjin-Hebei region to embark on the path of high-quality economic development. Given that there is still significant room for improvement in the integration of the three chains in the Beijing-Tianjin-Hebei region, it is of great practical significance to further strengthen research on the relationship between the industrial chain, innovation chain, and supply chain in the region, so that they can more effectively promote and coordinate development, assist the region in formulating reasonable regional industrial development policies, allocate various resources in the industrial chain, and improve the economic development level and regional competitiveness of the Beijing-Tianjin-Hebei region.

## **2. Current research status on the integration of industrial chain, innovation chain, and supply chain**

Xu applied a combination of theory and empirical research to study the implementation path of the integration of the “three chains”<sup>[1]</sup>. Hong believes that to enhance the modernization level of the industrial and supply chains, efforts need to be made in industrial technological innovation and key core technology research and development of products<sup>[2]</sup>. Wang proposed a matching strategy between the innovation chain and the capital chain by analyzing the structure, characteristics, and supply-demand relationship between them<sup>[3]</sup>. Tian and Gu analyzed the current situation of the integration development of the innovation chain and industrial chain in Nanjing, and proposed countermeasures for the integration development of the innovation chain and industrial chain<sup>[4]</sup>. Li considered the current situation of economic development both domestically and internationally, as well as the coordinated development of Beijing-Tianjin-Hebei, and proposed the optimal path for enterprise development at present<sup>[5]</sup>. Gao proposed a five-dimensional theoretical framework and conducted an in-depth analysis of the various elements within this framework<sup>[6]</sup>.

Liu believes that to build a high-energy industrial and supply chain, it is necessary to adhere to technological innovation as the core driving force and promote the full integration of government, industry, academia, and research<sup>[7]</sup>. Based on analyzing how the four driving forces generate their effects and the main limitations they face, the research group of the Institute of Industrial Economics, Chinese Academy of Social Sciences has proposed several corresponding countermeasures<sup>[8]</sup>. Yang considered the promoting role and strategies of universities in the collaborative integration of the Beijing-Tianjin-Hebei industrial chain, innovation chain, and supply chain<sup>[9]</sup>. Li proposed the “Three Chains” theory analyzed the interaction relationship between the “Three Chains,” and studied the basic conditions for collaborative innovation development in the Beijing-Tianjin-Hebei region<sup>[10]</sup>. Wang and Wu analyzed that suppliers have a significant negative regulatory effect

on the relationship between the level of technology research and development investment and enterprise response to shocks and resource acquisition <sup>[11]</sup>. Based on a comprehensive analysis of the internal and external environment faced by the coordinated development of the “three chains” in the Beijing-Tianjin-Hebei region using the Political, Economic, Social, Technological – Strengths, Weaknesses, Opportunities, Threats (PEST-SWOT) model, Li and Hou proposed suggestions suitable for the coordinated and integrated development of the “three chains” in the Beijing-Tianjin-Hebei region <sup>[12]</sup>.

The research team of the Development Research Center of the Government of Guangxi Zhuang Autonomous Region accelerated the building of the cross-border industrial, supply, and innovation chain, unblocked the domestic and international double circulation, and focused on playing a greater role in the construction of the “the Belt and Road” <sup>[13]</sup>. Wu *et al.* pointed out strengthening basic research, promoting deep integration of politics, industry, academia, research, and application, strengthening the position of enterprises as the main body of innovation, and fully leveraging the promoting role of digital technology in the integration of industrial chain innovation chains <sup>[14]</sup>. Huang proposed specific integrated development strategies by analyzing the industrial, innovation, and supply chains <sup>[15]</sup>. Through literature research on the integration of industrial, innovation, and supply chains in recent years, it has been found that the research on the integration of the three chains is still in its initial stage, and scholars tend to focus on the relationship between the two chains in the “three chains,” which is not systematic and in-depth enough. The research of domestic and foreign scholars has pointed out the direction for in-depth research on the integration strategy of the “three chains” in this article.

### **3. Theoretical integration of industrial chain, innovation chain, and supply chain in the Beijing-Tianjin-Hebei region**

In the context of the integration of the Beijing-Tianjin-Hebei region, the integration of the industrial, innovation, and supply chains refers to the establishment of a mutual promotion mechanism that relies on technological innovation to support the healthy and sustainable development of industries, relying on relevant enterprises and government departments in the Beijing-Tianjin-Hebei region. Guided by market demand and with enterprises as entities, we integrate scientific research institutions, universities, and innovative technology resources of enterprises in the region, improve the school-enterprise cooperation model, build industrial technology innovation platforms and bases, concentrate production factors such as technology, talent, and capital required for the development of advantageous industries. Collectively tackle key core technologies required for industrial transformation, reverse calculate capital, technology, and innovation chain demand based on market demand, vigorously promote the efficiency of scientific and technological achievements transformation and landing, promote the application and promotion of key technologies in various links of the industrial chain, and achieve income increase in industrial projects in the Beijing-Tianjin-Hebei region, thereby achieving sustainable and healthy development of the region’s economy.

The innovation chain promotes the upgrading of the industrial chain and enhances economic benefits. Relying on the relevant scientific research resources of the Beijing-Tianjin-Hebei region corresponding to each link of the industrial chain, with the continuous promotion of the “industry-university research” combined university education model. It effectively promotes efficient cooperation between university research groups and enterprises, fully utilizes the convenience of university scientific and technological research and development, and promotes the deep integration of the industrial, supply, and innovation chain according to the cutting-edge needs of industry applications, promoting the improvement of urban economic innovation capabilities, and is more conducive to promoting high-quality economic development in the Beijing-Tianjin-Hebei region through industrial cluster development. For enterprises in the region to stand invincible in today’s fierce competition,

they must have sufficient scientific research capabilities to achieve product updates and always meet the personalized needs of the people for new industries. Although product and technological innovation can be achieved through cooperation with research institutions in Beijing and Tianjin, enterprises also need to combine the characteristics of their own industries, strive to build their own scientific and technological talent team, make the innovation chain stronger, and lay the foundation for their sustainable development.

In summary, for enterprises in the Beijing-Tianjin-Hebei region to survive and develop in the current fiercely competitive environment both domestically and internationally, efforts need to be made to integrate industrial, innovation, and supply chains to avoid mutual obstacles. Therefore, how should the “three chains” coordinate and integrate with each other to achieve mutual promotion and achieve healthy development of enterprises? To provide reference and guidance for the development of enterprises in the Beijing-Tianjin-Hebei region, strategies for the integration of industrial, innovation, and supply chains are proposed.

## **4. Integration strategy of industrial chain, innovation chain, and supply chain in the Beijing-Tianjin-Hebei region**

### **4.1. Optimizing the spatial layout of the Beijing-Tianjin-Hebei triple chain**

Strengthen the deep integration of the industrial and innovation chain, promote cooperation between industry, academia, research, government, enterprise, and other parties to increase investment in scientific research, build research platforms, and develop new products according to market demand, thereby improving the conversion rate of enterprise innovation achievements and making enterprises more competitive. From the perspective of the position of Beijing, Tianjin, and Hebei in industrial integration, Beijing is the “vanguard” of national industrial innovation. Utilizing its technological innovation advantages, it integrates and infiltrates the two regions, jointly builds the Zhongguancun Science and Technology Industry Base in Xiong’an New Area with Hebei, and continuously improves the industrial technology innovation chain centered around Beijing. Tianjin is a bridge for industrial innovation and coordinated economic development in the Beijing-Tianjin-Hebei region. To connect Beijing and Hebei in the core technology research and development process of key industries, and jointly build industrial parks such as new materials, biopharmaceuticals, green chemicals, new energy, energy conservation, and environmental protection. Hebei relies on the development strategy of “two wings flying together” with Xiong’an New Area and Zhangjiakou area, leading various regions of Hebei to transform and upgrade traditional industries into emerging key industries, and carrying out extensive and close three-chain integration with Beijing and Tianjin. This not only serves the process of Beijing and Tianjin but also promotes the high-quality development of Hebei’s industries.

By optimizing the spatial layout of the industrial chain in key regions of Beijing-Tianjin-Hebei and promoting industrial structure reform, we aim to achieve deep integration of the three chains of Beijing-Tianjin-Hebei. Based on the distribution of industry, academia, and research resources in the Beijing-Tianjin-Hebei region, the design and research and development links in the industrial value chain will be located in Beijing, which has strong scientific research capabilities, and the production, manufacturing, and technical services will be located in the Tianjin-Hebei region to create a reasonable structural layout and clear chain function logic for the spatial layout of the region’s industrial chain.

### **4.2. Optimize the division of functions in the Beijing-Tianjin-Hebei region**

Firstly, the Beijing-Tianjin-Hebei region should reposition its roles in regional industrial, innovation, and supply chains. Beijing plays the role of a “technology leader” in the three regions of Beijing, Tianjin, and Hebei. By transforming scientific and technological research achievements into the early stages of the “three chains” in the

Tianjin-Hebei region, Beijing achieves deep cross-regional integration. The role positioning of Tianjin should avoid duplication with Beijing's functional positioning, and it is necessary to do a good job of connecting the two ends of the industrial chain. Hebei should make good use of its industrial development advantages to actively undertake deep processing of industrial resources from Beijing and Tianjin, implement the task of transforming innovative achievements at the end of the Beijing-Tianjin-Hebei innovation chain, and achieve coordinated industrial development in the region.

Secondly, the government and financial institutions must increase investment in funds and talent. Fully attract various venture capital and bank loans from the Beijing-Tianjin-Hebei region, and leverage the preferential policies and projects of the three regions to optimize the allocation of market resources. The integration of the industrial, innovation, and supply chains in the Beijing-Tianjin-Hebei region requires the intellectual support of talents. Therefore, it is necessary to establish a mechanism for introducing and cultivating scientific and technological talents in the Beijing-Tianjin-Hebei region. We need to increase the efforts of talent introduction policies in the Beijing-Tianjin-Hebei region, formulate incentive policies for talent exchange within the three regions, and mobilize the enthusiasm of professional talent mobility for scientific research and research. Following that, based on the characteristics and needs of the industries in the Tianjin-Hebei region, it is recommended to use expert appointment systems and other forms to invite Beijing experts to use their free time to integrate the three chains of industrial services. Additionally, design a talent cultivation mechanism for the Beijing-Tianjin-Hebei region. Increase support for universities and research institutions in Hebei Province, and improve the talent training system. With the help of preferential policies in Beijing and Tianjin, a special fund for talent cultivation will be established to focus on cultivating talents needed for traditional advantageous industries and urgently needed emerging strategic industries to ensure talent security for promoting the coordinated development of Beijing, Tianjin, and Hebei.

Thirdly, to achieve the integration of the industrial, innovation, and supply chains in the Beijing-Tianjin-Hebei region, it is necessary to make internal adjustments to the industries in the three regions. Based on the spatial optimization layout of the "three chains" of industries in the Beijing-Tianjin-Hebei region, and according to the characteristics of each region, create regional industrial clusters with core competitiveness, reconstruct the cross-regional innovation chain in the Beijing-Tianjin-Hebei region, and ensure that innovative technological achievements can accurately empower emerging key industries. Build an auxiliary support system around the "three chains" of the Beijing-Tianjin-Hebei region to ensure that the upstream and downstream links of the production chain and the development mode of key industries are in line with the ecological environment of the Beijing-Tianjin-Hebei industry, and ensure the sustained and stable growth of regional industrial economy.

## **5. Conclusion**

In summary, based on the analysis of the current research status of the integration of industrial, innovation, and supply chains, to maintain the sustained and stable economic growth of the Beijing-Tianjin-Hebei region, the integration strategy of the Beijing-Tianjin-Hebei three chains is proposed from two aspects: optimizing the spatial layout of the Beijing-Tianjin-Hebei three chains and optimizing the functional division of labor.

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## Disclosure statement

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