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Research on Integration Cluster Development of Strategic Emerging Industries in Hebei Province

-- A Case Study of Baoding

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Abstract

Strategic emerging industries and future industries are the main position for the development of new productivity, which is conducive to accelerating the construction of modern industrial system. It has an important leading and driving role in the overall economic and social situation and long-term development. This paper applies the theory of industrial cluster and the development of industrial integration to analyse the status quo, problems and challenges faced by the development of strategic emerging industries integration cluster in Hebei Province. Taking Baoding strategic emerging industries as an example to put forward a series of solutions to promote the high-quality development of strategic emerging industries integration cluster in Hebei by adhering to synergistic development, developing and expanding the 'chain master' enterprises, and expanding the international influence.

Keywords

Strategic Emerging Industries; Industrial Cluster; Solution.

1. Introduction

With the accelerated development of the new round of scientific and technological revolution and industrial change, the global industrial structure and layout have been deeply adjusted, and the trend of fusion of emerging industries has become more and more obvious. It is pointed out in the report of the 20th Party Congress that 'promoting the integration and cluster development of strategic emerging industries, and building a number of new growth engines such as new-generation information technology, artificial intelligence, biotechnology, new energy, new materials, high-end equipment, green environmental protection, etc.'. In addition, the National Development Plan for Strategic Emerging Industries in the 14th Five-Year Plan Period puts forward that 'Cultivate and expand strategic emerging industries and future industries, and promote the integration, clustering and ecological development of strategic emerging industries. The added value of strategic emerging industries will account for more than 17 per cent of GDP'.

Strategic emerging industries and future industries are the main battlefield for developing new quality productive forces, and play an important leading and driving role in the overall and long-term development of the economy and society. Strategic emerging industries, as new pillars and tracks leading future development, have become necessary to change the industrial development model, promote industrial integration and cluster development, form new competitive advantages, and achieve leapfrog development. The integrated and clustered development of strategic emerging industries is an important driving force for cultivating and strengthening new growth points, constructing a new development pattern, and implementing the new development concept to promote high-quality development.

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Based on the local industrial foundation and characteristic advantages, Hebei Province closely follows the two main lines of 'high-quality development and new energy agglomeration', seizes the opportunity, scientific planning, accelerates the construction of strategic emerging industry integration clusters and forms new quality productivity. This has important practical significance for promoting industrial restructuring and transformation upgrading, and driving high-quality economic development.

2. Development Status of Strategic Emerging Industry Integration Clusters in Hebei Province

Hebei Province has accelerated the work requirements for strategic emerging industries, organized and implemented actions for the integrated cluster development of strategic emerging industries, and vigorously promoted investment in construction projects, accelerating the strengthening and supplementation of the industrial chain. Strategic emerging industries have achieved rapid growth, showing a development trend of scale, concentration, and industrial integration. As of 2023, Hebei Province has recognized a total of 31 provincial-level strategic emerging industry demonstration bases and 3 national-level industry integration clusters. In 2023, the added value of the province's large-scale industrial enterprises increased by 6.9% year-on-year, accelerating by 0.3 percentage points compared to the first three quarters, and by 1.4 percentage points compared to the same period last year.

The government accelerated the construction of the "986" industrial cluster layout, deeply implemented the "Action Plan for Accelerating the Development of Strategic Emerging Industry Integration Clusters in Hebei Province (2023-2027)" and the "Implementation Plan for Promoting the Development of Strategic Emerging Industry Integration Clusters", and built a cluster gradient development system.They focused on supporting 9 industrial clusters, including biomedicine, new generation information technology, new energy vehicles and cultivating 8 future industrial clusters, including new materials, safety emergency equipment, and modern traditional Chinese medicine, aiming to create and cultivate distinctive industrial clusters with strong driving capabilities and international influence. There are 7 industrial clusters with operating income exceeding 100 billion yuan, of which 3 have operating income exceeding 200 billion yuan.

Currently, the development of strategic emerging industries in Hebei Province is in good condition, having basically formed distinctive, well-equipped, and highly concentrated strategic emerging industry clusters and industrial clusters. A number of industrial clusters with strong market competitiveness and international reputation, such as the Shijiazhuang bio-pharmaceutical industry and the new generation of electronic information industry clusters, and the Zhangjiakou big data full industry cluster, have been basically established (Table 1).

The industrial agglomeration effect in Baoding City is evident, with a prominent industrial base advantage and a strong development momentum. In recent years, Baoding has improved the '7 + 18 + N' modern industrial system, focusing on new energy and smart grid equipment industry clusters and new energy vehicles and intelligent networked automobile industry clusters, focusing on the cultivation of modern traditional Chinese medicine industry clusters. In 2023, Baoding achieved the province's above-scale industrial added value growth of 6.5% year-on-year, with 17 Hebei Province strategic emerging industry innovation top 100 enterprises, 1 national advanced manufacturing cluster, power and new energy high-end equipment industry cluster, automobile and parts industry cluster selected 2024 China private economy industry cluster top 100 list. Baoding also has 26 national 'small giants' enterprises, 114 provincial speciality and new demonstration enterprises, 4 strategic emerging industry demonstration bases above the provincial level (including 2 national ones), and has become a national innovation-driven development demonstration city and the province's only 'science and

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technology' pilot city in China. It has become a national model city for innovation-driven development and the only 'science and innovation' pilot city in the province. Hebei Province has also joined hands with Beijing and Tianjin to create the first six collaborative innovation industry chains, in which new energy vehicles and intelligent networked vehicles and robotics industry led by Hebei Province are developing strongly.

Table 1. Current Status of Strategic Emerging Industry Clusters in Hebei Province

No.	Industrial Cluster Category	Industry Chain and Direction	City
1	New Generation Electronic Information Industry Cluster	Semiconductors, modern communication, software and information technology services	Shijiazhuang
2	Bio-Pharmaceutical Industry Cluster	Biotechnology drugs, high-end chemical drugs, modern traditional Chinese medicine, high-end medical devices, and health and wellness	Shijiazhuang
3	Big Data Industry Cluster	Full big data industry chain of "data storage, computing power scheduling, equipment manufacturing + application services"	Zhangjiakou
4	High-End Equipment Manufacturing Industry Cluster	Special equipment industry chain, high-end engineering equipment, high-end marine and shipbuilding equipment, energy equipment	Qinhuangdao
5	High-End Equipment Manufacturing Industry Cluster	Intelligent rail transit equipment, robots, automobiles and parts, metallurgical equipment	Tangshan
6	Information Technology and Artificial Intelligence Industry Cluster	Electronic core industry, information technology services, artificial intelligence, and digital creativity	Langfang
7	New Energy and Smart Grid Equipment Industry Cluster	Photovoltaic technology and equipment, wind power generation equipment, power transmission and transformation equipment, energy storage technology and equipment	Baoding
8	New Energy Vehicles and Intelligent Connected Vehicles Industry Cluster	Key materials, parts support, complete vehicle manufacturing	Baoding
9	New Functional Materials Industry Cluster	Special gases, high-purity pig iron, new functional ceramics, intelligent office consumables, plant extraction new materials	Handan

3. Analysis of the Integrated Cluster Development of Strategic Emerging Industries in Hebei Province

There is no systematic discussion on the integrated cluster development of strategic emerging industries, and empirical research needs to go deeper. This paper applies the theory of industrial clustering and the concept of integrated development to analyze the current situation of integrated cluster development of strategic emerging industries in Hebei Province, identifying the issues and challenges. Taking the strategic emerging industries in Baoding as an example, it identifies the factors affecting the integrated development of strategic emerging industry clusters and proposes specific measures and suggestions to promote the development of such clusters. This study helps to enrich and deepen the research on the development of industrial clusters, which is of a certain importance and necessity. Additionally, it provides theoretical guidance for the government to formulate policies and explore new models of industrial cluster development, which has a certain theoretical value.

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Industrial integration currently does not have a unified definition. It generally refers to the mutual penetration and cross-fertilization of different industries or different sectors within the same industry, eventually merging into one, gradually forming a dynamic development process for new industries. The current domestic research mainly focuses on technological integration, digital integration, as well as the integration of industry chains, innovation chains, capital chains, and talent chains. The fundamental essence of industrial convergence, unlike simple industrial chain integration, lies in the integration among elements such as organizations, industries, markets, and regions, where the government, enterprises, markets, and agglomeration areas penetrate and intersect with each other, ultimately merging into integrated development.

Porter proposed the theory of industrial clusters from the perspective of competitiveness. It refers to a specific area where a group of interrelated companies, suppliers, related industries, specialized institutions, and associations are clustered, forming effective market competition through regional agglomeration. By optimizing the specialized production factors in this region, it reduces information exchange and logistics costs, leading to the formation of regional agglomeration effects, economies of scale, externalities, and regional competitiveness. A cluster is a group of geographically close related companies and institutions linked together by commonality and complementarity.

Combining industrial integration and industrial cluster theory, a strategic emerging industry convergence cluster refers to the development of industrial clusters in a certain agglomeration area. At the same time, within this specific region, there are interconnections among companies in different links of the unified industry chain, as well as connections between upstream and downstream companies in the industry chain. The degree of correlation is formed spontaneously by the companies themselves and also relies on government policy guidance and association support. Therefore, researching the development of industrial convergence clusters fundamentally involves the integration among elements such as government, enterprises, markets, penetrating and intersecting with each other, ultimately merging into integrated development.

3.1. Advantages of Strategic Emerging Industry Integration Clusters in Hebei Province

3.1.1. Significant Geographical Location Advantages

Hebei Province has inherent geographical advantages and abundant resource endowments. The rich solar energy, wind power, geothermal resources, etc., within the region have laid a solid foundation for its development as an industrial powerhouse. As an important part of the Beijing-Tianjin-Hebei world economic circle, Hebei Province has the important function of undertaking the non-capital function relocation from Beijing and connecting with the industrial transfer and factor outflow of Beijing and Tianjin. Baoding as an important node and hub city for the coordinated development of the Beijing-Tianjin-Hebei region, enjoys unique advantages.

3.1.2. Distinctive Industrial Cluster System

The strategic emerging industry system in Hebei Province covers key areas such as biomedicine, new energy and smart grid equipment, high-end equipment manufacturing, etc. It has certain well-known and influential backbone enterprises in strategic emerging industries, demonstrating good exemplary and leading roles. In the list of the top 100 innovative enterprises in Hebei Province in 2023, the top three industries are new materials with 20 companies, new energy with 20 companies, and high-end equipment manufacturing with 17 companies, accounting for 57%. As a gathering place for new energy vehicles and intelligent connected vehicles industry clusters, Baoding has a rich industrial foundation, complete industrial chain, and obvious industrial agglomeration.

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3.1.3. Strong Talent Support.

There are many universities in Hebei Province, providing a large number of fresh graduates every year, with an average annual number of graduates reaching 550,000. Among them, Baoding has 19 universities including North China Electric Power University and Hebei University, with 280,000 students. Among the non-provincial capital cities in the country, it has the largest number of universities and university students, continuously providing service talents for the industrial development of Baoding and offering strong talent support.

3.1.4. Adequate Industry-Academia-Research Platforms

Hebei Province leverages the role of universities in the scientific and technological innovation system, strengthens the integration of production, education, and research, encourages research institutions to collaborate with enterprises on key technology research, and accelerates the efficiency of technology transfer. There are 7 national key laboratories for photovoltaics in the industrial agglomeration area, and many enterprises have established technology research and development bases with domestic and foreign universities and research institutions, laying a solid foundation for enhancing the region's independent innovation capability.

3.2. Weaknesses of Strategic Emerging Industry Integration Clusters in Hebei Province

3.2.1. Imperfect Infrastructure and Related Policies

The infrastructure and related policies are not well-developed. Although Hebei Province's strategic emerging industries have made significant progress, there are still many deficiencies. The main issues are the weak infrastructure, unbalanced regional development, slow progress in interconnectivity, which hinders the integrated development between regions, and the underutilization of policy advantages, insufficient coordination between governments, lack of awareness to seize opportunities, absence of policies supporting related industries, and weak attractiveness for the transfer of industries from Beijing and Tianjin, leading to slow progress in collaborative development and deep integration.

3.2.2. Small Scale of Industrial Clusters and Low Capacity for Independent Innovation

Overall, the scale of industrial clusters in Hebei Province's strategic emerging industries is relatively small, with fewer industrial agglomeration areas that have significant influence domestically and internationally. In 2022, the added value of high-tech industries above designated size in Hebei Province accounted for 20.6% of the total industrial added value, a more significant gap compared to developed provinces such as Anhui and Jiangsu, and the overall driving force of the industrial clusters is not strong. Secondly, the capacity for independent research and development is weak, and the ability to iterate products is poor. Lacking of key technologies at the high end of the value chain, weak core competitiveness, and low product added value. The number of authorized patents and the quantity of research and development results transformed in the industrial agglomeration area are still far behind other developed provinces. Finally, the integration degree of the industrial clusters is not high. The development of industrial clusters is still in the primary stage, with the basic formation of industries and their supporting industries at the same link in the industrial chain, but the division of labor among enterprises and the supporting capabilities of the industry are poor, and most are small and medium-sized enterprises, with an insufficient number of "specialized, refined, unique, and new" model enterprises.

3.2.3. Talent Introduction Policies with Low Implementation Intensity

The efforts to introduce high-level talents are not strong, and the implementation of policies is not in place. The development of industries in the region requires high-level talents. Although relevant talent policies have been introduced and a series of talent attraction activities have

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been held, the policies are not implemented effectively, which cannot meet the demands of high-end talents, leading to a situation where talents cannot be retained, projects cannot be introduced, and results cannot be realized.

3.2.4. Low Level of Intelligence and Low Market Share

The level of high-end intelligence is not high, and the market share is low. Most products have a low degree of intelligence and marketization, and their attractiveness to consumer demand is not strong, and the product scale and market competitiveness are still in urgent need of improvement.

4. Conclusion

4.1. Strengthen Government Guidance and Promotion to Form Deep Integrated Development

Firstly, the government should carry out top-level design for the development of industrial integration clusters, implement detailed action plans, coordinate policies, resources, talents, markets, and other elements to promote their scientific and optimized allocation. Secondly, enhance the match between industry and regional development, increase the scientific and targeted nature of regional development, start with existing enterprises, start-ups, and advanced manufacturing enterprises, and explore cooperation mechanisms for mutual benefits across regions in advance, achieving "opening up new situations and strengthening and enlarging". Finally, improve regulatory services, ensuring both service guarantees and effective supervision, avoiding the rush to introduce projects. Enhance the government's ability to analyze and predict production and supply, relying on artificial intelligence, big data models, and other data to improve the intelligent process of risk control, thereby enhancing the autonomy and resilience of the industrial and supply chains.

4.2. Accelerate Integration into the Coordinated Development of the Beijing-Tianjin-Hebei Region, Gathering New Momentum for Regional Development

"Reasonably planning industrial layout, focusing on straightening out the industrial development chain, optimizing the industrial structure, and forming a rational division of labor and linkage mechanism between industries in different regions" is the main task of the coordinated development of the Beijing-Tianjin-Hebei region. In addition to strengthening the interconnectivity of infrastructure, Hebei Province should expand the depth and breadth of coordinated development, seizing opportunities for full-region docking and industrial transfer. Utilize local resource endowments and advantages, actively integrate into the coordinated development of the Beijing-Tianjin-Hebei region, and establish a high-quality and high-level modern coordinated development demonstration zone. Build economic corridors connecting Beijing and Tianjin from different directions, and jointly create advanced manufacturing industry clusters. Focus on the undertaking of the second and third level subsidiaries of central enterprises and innovative business segments, allowing more Hebei products and services to enter the industrial and supply chains of central enterprises, promoting the matching and organic integration of the industrial chain and the innovation chain.

For the Baoding industrial cluster, it should further clarify its industrial function positioning in the capital economic circle, forming a scientific and efficient competitive and cooperative relationship in the Beijing-Tianjin-Hebei economic circle. It is necessary to focus on coordinated development, link with Xiong'an, connect with the "five clusters, six chains, five corridors" industrial map of the Beijing-Tianjin-Hebei region, select a number of strategically emerging industrial parks and enterprises with mature conditions and close horizontal connections, regularly organize industrial coordination docking, and promote cross-regional integration of

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regional industrial and supply chains. This is of great importance for Baoding City to gather resources, adjust industrial structure, and enhance the value chain to the high end.

4.3. Promote the Integration of Technological and Industrial Innovation to Enhance the Competitiveness of Industrial Clusters

Technological innovation is a strong support for high-quality development. To enhance the modernization level of Hebei Province's industrial system, it is necessary to build platforms and establish innovation alliances. Based on the in-depth docking with high-tech industries and modern services in Beijing and Tianjin, promote the co-construction and sharing of innovative application scenarios, and accelerate the construction of collaborative innovation technology platforms. Support enterprises to cooperate deeply with scientific research institutions such as Zhongguancun and the Chinese Academy of Sciences, carry out common technology research, coordinate the advancement of core technology breakthroughs for enterprises, and enhance the capacity for innovative development. Relying on leading enterprises in the industry to build key laboratories, engineering research centers, and enterprise technology centers, and other innovative platforms to promote the deep integration of the industrial chain and innovation chain. Utilize the role of universities in the technological innovation system, strengthen the integration of industry, science, and education, encourage scientific research institutions to jointly tackle key technologies with enterprises, and accelerate the efficiency of technology transformation. Promote the upgrading of the industrial structure, update equipment and upgrade processes in industries such as steel, petrochemicals, and food, and move towards high-end, intelligent, and green development. Accelerate the development of industries such as integrated circuits, network security, biomedicine, power equipment, and safety emergency equipment, carry out the "robot plus" application action, strengthen the new energy and intelligent connected vehicle industry cluster, promote the large-scale application and development of Beidou, and cultivate new advantages in the electronic information industry.

4.4. Cultivate and Strengthen Leading Enterprises to Enhance Corporate Innovation Capability

The integrated development of strategic emerging industries should aim at new fields, grasp key directions, cultivate and strengthen a batch of new engines for growth, and create new competitive advantages. Give full play to the "chain leader" role of leading enterprises, develop supporting industries upstream and downstream around leading enterprises, make up for shortcomings and weak points, stabilize and strengthen the chain, and consolidate industrial advantages with a complete high-quality industrial chain. Strengthen the real economy and cultivate new momentum and advantages. Encourage the development of "specialized, refined, unique, and new" small and medium-sized enterprises, making them the source of corporate innovation capabilities. Accelerate the breakthrough and application of key core technologies to enhance the core competitiveness of enterprises. Especially in the fields of new energy, intelligent connected vehicles, etc., accelerate the transformation and development of industries towards high technology, high added value, and green transformation, take the lead in trying, accelerate the deep integration with new generation information technology, new materials, promote the integration and application of new technologies such as artificial intelligence, big data, and cloud computing, and promote the integrated cluster development of strategic emerging industries to increase market share. Accelerate the gathering of "high-end, precise, and scarce" talents, continue to build high-level talent platforms, deepen the reform of talent development systems and mechanisms, implement classified policies and precise services, and continue to supply talents to emerging industries. At the same time, strengthen the innovation and application of digital technology, focus on improving digital infrastructure and equipment updates, and promote the integrated development of the digital economy and the real economy.

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4.5. Fully Utilize Both Domestic and International Markets to Expand International Influence

At present, the development of China's new energy vehicle industry is rapid, and the market prospects are broad. Intelligence and connectivity are the development directions of new energy vehicles. To expand domestic demand and lead green consumption, it is necessary to fully utilize the activities of new energy vehicles and green smart home appliances going to the countryside, expand and stimulate residents' consumption, and seize the domestic market. At the same time, actively expand the international market, avoid international trade barriers, and deeply participate in international market competition by using the China-Europe Railway Express to build factories overseas, achieving significant improvements in scale and quality.

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