

Research on the Upgrading Path of Dalian Cherry Industrial Park under Four-Chain Coupling

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Abstract: Agricultural industrial parks have become important carriers and platforms to promote the high-quality development and high-level construction of agriculture and rural areas in China. In-depth research on them is of both theoretical and practical significance. the No. 1 Central Document in 2017 officially proposed the construction of modern agricultural industrial parks featuring "production+processing+technology". The cherry industry is an important part of Dalian's regional economic development and plays a crucial role in its economic growth. This paper takes the Dalian Cherry Industrial Park as the research object, deeply analyzes its current development status, reveals the achievements and existing problems in its development process, and studies the upgrading path of Dalian Cherry Industrial Park from the perspective of "integration of talent chain, capital chain, industrial chain, and innovation chain", so as to promote the high-quality development of Dalian Cherry Industrial Park, enhance its industrial competitiveness, and provide strong support for regional economic development.

Keywords: Four-Chain Coupling; Dalian Cherry; Development Status; Upgrading Path

1. Introduction

In recent years, the continuous growth of market demand and the rapid progress of science and technology have brought opportunities as well as obvious challenges to the development of Dalian's cherry industry. the No. 1 Central Document in 2025 clearly requires cultivating rural characteristic industries, focusing on the development of green high-quality agricultural products, promoting the upgrading and transformation of agricultural product processing industries, implementing agricultural brand construction projects, and establishing

characteristic agricultural industry clusters to improve the level of agricultural industrialization. the guidance issued by the Ministry of Agriculture and Rural Affairs in 2021 specially points out that it is necessary to strengthen the combination of the industrial chain and the innovation chain, improve supply chain management, increase product added value, ensure capital flow, and enhance the stability and competitiveness of the industrial chain through technological innovation, industrial collaboration, value improvement, and financial support. Dalian, with its unique natural conditions, has become an important large cherry production base in the country, and its products have obtained national agricultural product geographical indication certification. At present, the local government is combining the central policy orientation with local resource advantages, focusing on relying on geographical indication products, and comprehensively promoting the development of characteristic agricultural industries through two ways: improving the industrial chain and strengthening brand construction. Therefore, the study on the development status of Dalian Cherry Industrial Park and the upgrading path based on the integration of four chains is of great significance.

2. Development Status of Dalian Cherry Industrial Park

2.1 General Situation of Dalian Cherry Industry Development

Dalian cherry cultivation and development have a variety of planting foundations and have now formed a large-scale planting model. According to data, as of 2025, the planting area of large cherries in the region has reached 360, 000 mu, with an annual output of 265, 000 tons and an output value of more than 10 billion yuan, accounting for about 23% of the national total output. Geographically, Dalian cherries are mainly distributed in Lvshunkou District,

Wafangdian City, Pulandian District, and Jinpu New Area, forming the spatial characteristics of "South Lvshun, North Wafangdian". Dalian cherry planting has also made remarkable achievements in the field of facility agriculture. For example, the area of rain shelter facilities has reached 3,500 hectares, accounting for 50% of the total area of similar facilities in the country[1]. As shown in Table 1, the planting area, output, and output value of Dalian cherries showed an increasing trend from 2019 to 2023. At the same time, different regions have formed unique cherry planting modes and variety layouts according to their natural conditions and planting traditions.

Table 1. Dalian Cherry Output and Output Value

Year	Planting Area (10000 mu)	Output (10000 tons)	Annual Output Value (100 million yuan)
2019	19	16.2	76.9
2020	23	20.7	81
2021	27	22.3	98.7
2022	32	25.6	117.6
2023	36	26.5	121.9

(Data source: Dalian Bureau of Statistics official website)

Dalian cherries have a variety of varieties, including early-maturing, mid-maturing, and late-maturing types. The main planting varieties include Meizao, Hongdeng, Jiahong, Summit, and Rainier. The Meizao variety is deeply loved by consumers because of its large fruit, good color, and high sweetness, and has now become the core cultivated variety in the region. In recent years, according to changes in market demand, the local area has successively introduced new varieties such as Regena and Kordia for trial planting and promotion to gradually improve the variety composition structure. It obtained the national agricultural product geographical indication certification and the national regional public brand title in 2018 and was included in the *Catalogue of Chinese Agricultural Brands*[2].

The sales market of Dalian cherries covers major domestic cities and is exported overseas. Domestic sales mainly adopt a combination of traditional wholesale markets, supermarket physical stores, and new channels such as e-commerce platforms and live broadcasts. The current industrial chain covers many links such as seedling cultivation, planting production, product processing, warehousing and logistics, terminal sales, and agricultural tourism, but the proportion of deep-processed products is only about 10%, mainly producing cherry wine,

canned food, and other products, so the added value of products needs to be improved[3]. In addition, it can be seen from the data in Figure 1 that China's cherry imports generally show an upward trend, which provides opportunities for the development of Dalian's cherry industry.

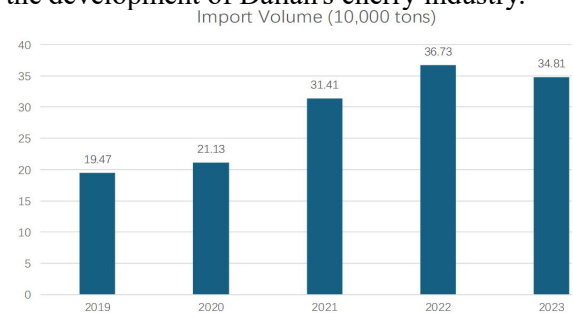


Figure 1. China's Cherry Import and Export Trade

(Data Source: China Customs)

2.2 Planting Technology Innovation

Dalian focuses on the development of advanced technologies such as facility cultivation, dwarfing and close planting, and green prevention and control in the field of planting technology. The facility cultivation adopts the structure of semi-arch and continuous rain shelters. After using this technology, the fruit cracking rate is reduced from 30% to 13.6%, and it also realizes the extension of the fruit shelf life and the prevention of "late spring cold" disasters. Dwarfing and close planting improve yield and fruit quality through the transformation of hedge-shaped tree forms. The green prevention and control technology integrates pollution-free prevention and control means such as microbial preparations and sex attractants, and introduces beneficial poultry to maintain ecological balance[4], so as to reduce the use of pesticides and ensure the quality and safety of cherries.

2.3 Innovation in Preservation and Processing Technology

In order to solve the problem of short storage and preservation time of cherries, Dalian has increased its research and development efforts in preservation technology. At present, low-temperature storage, controlled atmosphere preservation, and preservative treatment are mainly applied, which can significantly extend the preservation period of cherries. At the same time, it has joined hands with logistics channels such as China Post EMS and SF Express to establish a special logistics channel to ensure that key cities across the country can achieve

next-day delivery, and the coverage of cold chain transportation has been expanded to 70 cities. In the processing field, deep-processed products such as cherry wine, fruit juice, and fruit preserves have been developed to enhance product added value.

2.4 Construction of Scientific and Technological Innovation Platforms

The *Implementation Opinions of Dalian on Accelerating the Development of the Big Cherry Industry* in 2018 clearly requires the construction of a scientific and technological innovation demonstration park, which includes integrating scientific research forces and focusing on improving cherry varieties, such as independently cultivating new varieties resistant to storage and transportation such as Milu and Xiuzhu. the Dalian Cherry Research Institute was also established to coordinate industry-university-research cooperation and build platforms such as demonstration parks. At the same time, by promoting joint research between enterprises and scientific research institutions, technological achievements transformation is promoted, so as to effectively improve the industry's innovation capability.

3. Problems in the Development of Dalian Cherry Industrial Park

3.1 Insufficient Innovation Collaboration

Although Dalian Cherry Industrial Park has made progress in technological research and development and industrial construction, an effective collaborative mechanism has not yet been formed between the industrial chain and the innovation chain, which is specifically manifested in the following points. First, there is a disconnection between scientific research output and actual needs. the variety structure also shows the characteristics of insufficient supply of early-maturing varieties and too high proportion of mid-late-maturing varieties, and the number of varieties with independent intellectual property rights is also insufficient. Second, the driving role of the industrial end on technological innovation is still relatively weak, and there is a lack of a stable cooperation mechanism between scientific research institutions and business entities, which will lead to the failure of new varieties and new technologies to be fully transformed into market competitiveness[5] . Third, there is also the

problem of lagging promotion, which will lead to low acceptance by farmers. In addition, growers lack knowledge of scientific management of agricultural production, which will lead to low availability of technology.

3.2 Talent Shortage

The development and construction of Dalian Cherry Industrial Park require the support of a large number of professional talents, involving many fields such as planting technology, operation management, and market sales. At present, there is a shortage of professional talents in the region, especially senior technical talents and innovative talents. At the same time, the gap in professionals in the fields of technology promotion, brand management, and international trade is more obvious, and 82% of the planting group have a junior high school education or below. the educational level limits their ability to master modern technology. the problem of insufficient talent will directly restrict the improvement of technological innovation and industrial management levels. Then, according to the prominent phenomenon of aging of production subjects, the proportion of middle-aged and elderly growers is relatively high, and it is difficult to learn new technologies, which will lead to backward production management methods and finally make it difficult to improve overall efficiency [3] .

3.3 Insufficient Capital Investment

The development of Dalian Cherry Industrial Park requires a large amount of financial support, involving many links such as the construction of planting facilities, technological research and development, and market development. However, the current scale of capital investment is limited. the construction cost of facility agriculture involved is relatively high, and the construction of rain shelters, cold chain logistics, and other infrastructure still requires concentrated investment, so farmers are facing great financial pressure[1] . In addition, there is insufficient investment in the deep processing field of the industrial park, and the number of processing enterprises is small. At present, only 15% of the output is used to make cherry wine, canned food, and other products, so the development of high-value-added products is lagging. the government subsidies are also scattered, making it difficult to form an effective support system. the problem of insufficient investment in scientific and

technological innovation is also prominent. the overall funding gap seriously restricts the process of industrial upgrading.

3.4 Brand Construction Needs to be Strengthened

Dalian big cherries have a certain popularity in domestic and foreign markets, but there are still obvious problems in brand construction. For example, the awareness rate of geographical indication brands is only 16%, consumer attention is low, and there are irregularities in brand use. It also includes loose regional brand management. For example, the use of the "Jinzhou Big Cherry" logo lacks a unified standard, which will lead to the abuse of the logo[4]. On the other hand, the investment in promotion is insufficient, and the marketing methods are single. In the promotion, it mainly relies on traditional sales channels, and the use rate of e-commerce channels is less than 5%. the promotion in the international market is even weaker, so the overall awareness needs to be improved. Then, the design of product packaging is sometimes simple and lacks characteristics, making it difficult to achieve price premium. All these phenomena make the brand value have a large space for improvement.

4. Upgrading Path of Dalian Cherry Industrial Park - From the Perspective of "Four-Chain Integration"

4.1 Single-Chain Driven Type: Innovation Chain Leads Industrial Upgrading

Taking the innovation chain as the core driving force, on the one hand, promote the upgrading of the cherry industrial chain through technological breakthroughs, such as developing application scenarios such as intelligent monitoring systems for cherry diseases and insect pests to help optimize the planting link; on the other hand, rely on high-skill needs to attract the gathering of the talent chain, such as guiding college teachers and students to enter the industrial park for practical teaching to improve the level of technological application and innovation; it can also rely on technological value to attract the investment of the capital chain, such as the government and enterprises jointly building a diversified investment system to promote scientific research. At the same time, the application scenario feedback brought by the upgrading of the industrial chain, the experience

accumulation generated by the gathering of the talent chain, and the research and development re-support after the investment of the capital chain can all form the development of feedback to the innovation chain. the single-chain driving model diagram leading the industrial upgrading with the innovation chain of Dalian cherry industry as the core is specifically shown in Figure 2.

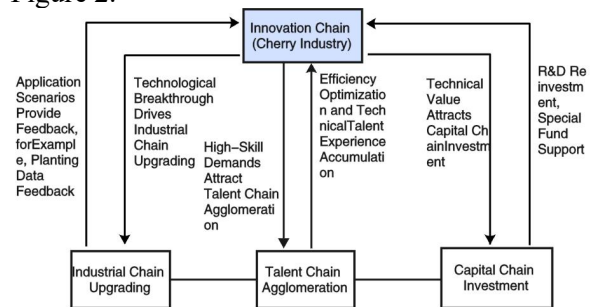


Figure 2. Single-Chain Driven Model Diagram of Innovation Chain

4.2 Dual-Chain Collaborative Type: Capital Chain and Talent Chain Collaborate

The capital chain and the talent chain work together to provide capital injection (government-set special development funds, diversified financing by enterprises, etc.) and intellectual support (introduction of innovation teams, school-enterprise cooperation to cultivate talents, etc.) for the innovation chain, and provide productivity improvement (guaranteeing the upgrading of planting facilities, production safety, etc.) and resource allocation optimization (building seedling cultivation bases, expanding markets, etc.) for the industrial chain. the profit from the commercialization of technology in the innovation chain, the employment opportunities created by the development of the industrial chain (such as the expansion of deep processing enterprises) and the scale effect (the growth of e-commerce platform sales) can form feedback to the capital chain and the talent chain, so as to promote the dynamic balance among the four chains. the dual-chain collaboration model based on the capital chain and the talent chain is shown in Figure 3.

4.3 Multi-Chain Focused Type: Innovation, Industry, and Talent Chains Empower the Capital Chain

In the innovation chain, realize commercialization through patent technology transfer and intelligent equipment application, and attract venture capital and enterprise

cooperation; rely on the scale of the seedling base in the industrial chain, the diversification of deep-processed products, and the networking of e-commerce sales to improve the overall income and financing ability; bind the core team through equity incentives in the talent chain, and improve the corporate reputation through school-enterprise cooperation. As shown in Figure 4, relying on the joint efforts of the innovation chain, industrial chain, and talent chain, enhance the attractiveness of Dalian's cherry industry to capital, attract bank loans and social investment to enrich the capital chain, and through the capital chain, feedback to innovation research and development, industrial expansion, and talent cultivation again, so as to promote the sustainable development of Dalian Cherry Industrial Park.

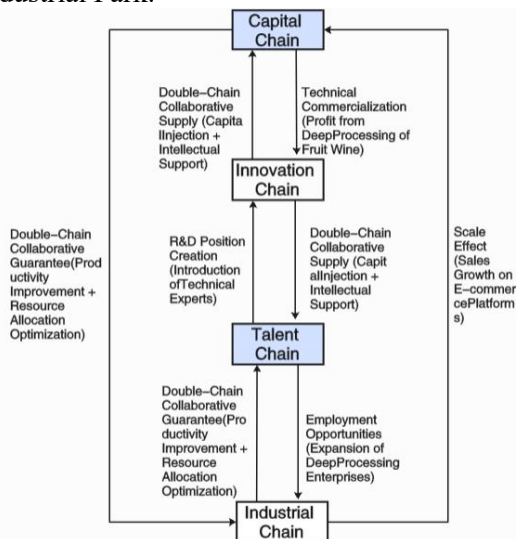


Figure 3. Dual-Chain Collaborative Model Diagram of Funding Chain and Talent Chain

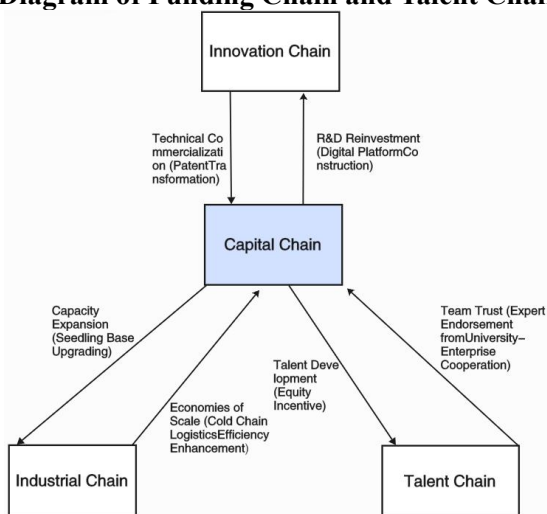


Figure 4. Multi-Chain Focused Model Diagram of Innovation, Industry, and Talent Chains

5. Conclusion

At present, existing studies have fully demonstrated the importance of industrial collaborative development, and practice has shown that local optimization of a single chain is difficult to break through the development bottleneck in the process of agricultural modernization. Dalian Cherry Industrial Park can form a mutual multi-chain cycle promotion among the innovation chain, industrial chain, talent chain, and capital chain, and build a flexible industrial ecosystem through the deep integration of multiple links such as the talent chain gathering wisdom, the capital chain gathering funds, the industrial chain gathering momentum, and the innovation chain gathering energy. In the future, it is more necessary to take new productive forces as the guide, continuously deepen the collaborative mechanism among the "four chains", so as to promote the transformation of characteristic agriculture from scale expansion to value improvement. the practice path of promoting the development of Dalian Cherry Industrial Park is precisely the innovative transformation and development of existing research results. the exploration of Dalian Cherry Industrial Park is not only an effective practice to solve the problems of regional industrial development but also a vivid example to practice the rural revitalization strategy of "industrial prosperity", providing extremely valuable "Dalian experience" for the revitalization of rural industries across the country.

Acknowledgments

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