Research on Innovation Capacity of Chongqing Pharmaceutical Industry

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ABSTRACT
In order to promote the high-quality development of Chongqing's pharmaceutical industry, this article takes innovation capacity research as the starting point, deeply analyzes the current situation and challenges of Chongqing's pharmaceutical industry innovation capacity development from eight aspects: innovation foundation, innovation capacity, innovation subject, innovation input, innovation talent, innovation output, innovation benefits, and innovation environment, and proposes corresponding policy recommendations.

Keywords: *Pharmaceutical industry, Innovation capacity, Research.*

1. INTRODUCTION

Benefiting from the promotion of the national western development strategy and the synergistic effect brought by the construction of the Chengdu-Chongqing dual city economic circle, Chongqing's pharmaceutical industry has gradually occupied an important position in the national pharmaceutical industry pattern in recent years, thanks to its unique location advantages, perfect industrial chain layout, and continuous growth in research and development investment. While the pharmaceutical industry in Chongqing continues to make progress, the enhancement of innovation capacity still faces many challenges, such as the need to increase research and development investment intensity, insufficient reserve of high-end talents, the need to enhance brand influence, relatively backward infrastructure and supporting services, and intensified market competition.

2. RESEARCH ON INNOVATION IN CHONGQING'S PHARMACEUTICAL INDUSTRY

2.1 Steady Progress in Innovation Foundation

2.1.1 Infrastructure Investment Solidifying the Foundation of Innovation

In recent years, Chongqing's pharmaceutical industry has continued to increase investment in innovative infrastructure, providing solid support for the development of regional pharmaceutical technology. It is necessary to optimize the industrial spatial layout into a "one core, multi pole" pattern, with the main city as the core, radiate to western and southeastern Chongqing, enhance collaborative efficiency, and support the growth of small and medium-sized enterprises. At the same time, the green and low-carbon concept is deeply integrated into the construction of the base, promoting the formation of an environmentally friendly manufacturing system and enhancing industrial sustainability.

2.1.2 Platform Layout Construction Expanding Innovative Channels

The Chongqing pharmaceutical industry innovation platform presents a diversified and clustered development trend, with a steady increase in the number of platforms covering the entire chain of basic research, application development, pilot scale transformation, and clinical trials. As of 2024, there are over 150 biopharmaceutical innovation platforms in the city, with 65% of platforms at or above the provincial level. With the continuous improvement of high-level platforms, the optimization of Chongqing's pharmaceutical innovation ecosystem is accelerating, injecting sustained momentum into technological breakthroughs and industrial upgrading.

2.1.3 Optimizing Resource Allocation to Build an Innovative Pattern

Chongqing's pharmaceutical industry is strengthening the integration of innovative resources, and has initially formed an innovative pattern guided by the government, coordinated by multiple parties, and with the flow of factors. The government promotes cooperation between enterprises, colleges and universities, and research institutes through special funds and supportive policies, achieving breakthroughs in both technological research and talent cultivation. Innovation resources are shifting from decentralization to synergy, laying the foundation for the transformation of industries from "factor driven" to "innovation driven".

2.2 Continuous Enhancement of Innovation Capacity

2.2.1 Innovation Input Continuing to Grow

The R&D investment in Chongqing's pharmaceutical industry continues to rise, with a steady increase in R&D intensity, reflecting the enhanced willingness of enterprises to innovate. The national "14th Five-Year Plan" and Chongqing's "Several Measures to Accelerate the High-Quality Development of the Biopharmaceutical Industry" have formed a policy synergy, stimulating research and development enthusiasm through special funds and tax incentives, and promoting enterprises to increase basic research and layout in emerging fields such as biopharmaceuticals and high-end equipment.

2.2.2 There Being Repeated Breakthroughs in Core Technologies

Chongqing's pharmaceutical industry has achieved multiple technological breakthroughs in the fields of biopharmaceuticals and modern traditional Chinese medicine. The development of new drugs and high-end formulations is still in the catching up stage, but with the deepening of investment and the promotion of industry university research collaboration, more independent intellectual property achievements are expected to emerge in the future, enhancing regional industrial competitiveness.

2.2.3 Improving the Efficiency of Transforming Innovative Achievements

In 2024, the transaction volume of technology contracts in Chongqing's pharmaceutical industry exceeded 1.8 billion yuan, a year-on-year increase of over 20%, and the transformation of achievements has accelerated significantly. The government has established platforms such as the Biomedical Collaborative Innovation Center and the High-tech Zone Transformation Base, optimized the approval process, strengthened intellectual property protection, integrated clinical resources, and shortened the "laboratory-market" cycle.

2.3 Innovation Subject Injecting Vitality

2.3.1 Innovation Subject Optimizing Diversity

The main structure of innovation in Chongqing's pharmaceutical industry continues to be optimized, forming a multi-level system with leading enterprises as the core, small and medium-sized enterprises as the support, and foreign-funded enterprises as supplements. The government guides enterprises to focus on new drug research and development, intelligent manufacturing, and green production through special funds and approval optimization.

2.3.2 Research Institutes Assisting in Industrial Innovation, Transformation, and Upgrading

Colleges and universities and research institutions such as Chongqing University, Southwest University, and Chongqing Medical University continue to provide technology and

talent to the industry. In 2024, colleges and universities in Chongqing undertook over 200 national and provincial-level pharmaceutical research projects, receiving research funding of over 1 billion yuan, a year-on-year increase of 15%. Through the mechanism of industry-university-research collaboration, laboratory achievements are accelerated for transformation, promoting collaborative innovation in the industrial chain. The construction of "Double First-Class" enhances the strength of the pharmaceutical discipline, delivers high-quality talents to the industry, and knowledge innovation has become the core driving force for transformation and upgrading.

2.3.3 Main Body Linkage Enhancing Innovation Synergy

The innovation synergy integrates resources from enterprises, colleges and universities, institutions, and medical institutions to promote technology sharing and joint research and development. As of early 2025, Chongqing has established multiple innovation alliances covering traditional Chinese medicine, chemical medicine, biopharmaceuticals and other fields, with over 200 members, significantly promoting breakthroughs in key technologies and product launches. The deepening of cross-regional and cross-industry collaboration mechanisms in Chongqing will further unleash synergies and enhance regional core competitiveness.

2.4 Continuous Increase in Innovation Input

2.4.1 Increasing Input in Innovative Equipment

The pharmaceutical industry in Chongqing continues to upgrade in terms of progressiveness equipment. Through cooperation with international scientific research institutions, it accelerates the process of biological drug research and development, and promotes the rapid entry of new drugs into clinical trials. The industrial layout extends to the industrialization stage, the innovation ecosystem is becoming increasingly mature, and the equipment competitiveness is significantly enhanced, laying a hardware foundation for industrial upgrading.

2.4.2 Increasing Input in Innovative Technology

Chongqing's pharmaceutical industry is accelerating the introduction and digestion of technology, and building a digital innovation system for the entire modern traditional Chinese medicine industry chain. In April 2025, the 66th National Pharmaceutical Machinery Expo will showcase key technologies in synthetic biology, including DNA engineering, biomolecular engineering, host engineering, and data science, marking the industry's transition from traditional pharmaceuticals to high-end biopharmaceuticals and providing solid support for technological upgrading to sustainable development.

2.4.3 Increasing Input in Innovative Funds

The funding sources for Chongqing's pharmaceutical industry are diverse, with government support and coordinated efforts in market-oriented financing. Optimization of closed-loop management of funds and synchronous enhancement of compliance and liquidity can provide robust financial support for continuous innovation.

2.5 The Mechanism for Attracting and Nurturing Innovative Talents Becoming Increasingly Perfect

2.5.1 Optimizing the Gathering of Innovative Talents

In recent years, Chongqing's pharmaceutical industry has achieved significant results in the aggregation and structural optimization of innovative talents, laying a solid foundation for the high-quality development of the regional biopharmaceutical industry. The pharmaceutical industry in Chongqing presents diversified, specialized, and international characteristics in terms of talent structure, providing strong support for the continuous innovation of the industry.

2.5.2 The Level of Innovative Talent Cultivation Being Significantly Improved

Chongqing's pharmaceutical industry has made precise policies and achieved outstanding results in the introduction and cultivation of high-level talents. Through measures such as tax reductions, R&D subsidies, and innovation incentives, it has

effectively reduced enterprise costs, enhanced talent attraction, and retention rates. The government provides supporting measures such as housing subsidies and research start-up funds to help talents root in the local area.

2.5.3 The Talent Incentive Mechanism Becoming Increasingly Mature and Diverse

Chongqing optimizes the business environment, builds a high-quality development platform for pharmaceutical talents, establishes special scientific research funds, facilitates promotion channels, stimulates the potential of local talents, and constructs a full chain incentive system of "basic research - technological breakthroughs - clinical translation - industrial application".

2.6 Significant Innovation Output Achievements

2.6.1 Technological Innovation Growing Steadily

The patent output of Chongqing's pharmaceutical industry continues to increase, demonstrating strong innovation activity despite the long approval cycle and high threshold of the industry. Enterprises are accelerating their shift from imitative innovation to independent research and development, with patent layouts focusing on areas such as modernization of traditional Chinese medicine, biopharmaceuticals, and high-end medical devices.

2.6.2 The Development of New Drugs Making Significant Progress

The new drug research and development capacity of Chongqing's pharmaceutical industry continues to strengthen, and the industry is moving from single product development to systematic innovation, especially in the fields of infectious disease prevention and control and chronic disease treatment, forming a relatively complete research and development system. With increased policies and capital, it is expected to achieve greater breakthroughs in the future.

2.6.3 The Competitiveness of Innovative Products in the Market Being Enhanced

Chongqing pharmaceutical companies are seizing the market through differentiated layout. For example, Taiji Group has been selected for 409 varieties in the 2024 National Medical Insurance Catalog, with 1240 approvals for traditional Chinese and Western medicine, of which 87 are exclusive to the whole country, highlighting its product exclusivity and market recognition. The market positioning in the fields of traditional Chinese medicine preparations, biopharmaceuticals, and medical devices is clear, and it is expected to expand its market share in the national and even global markets.

2.7 Innovation Benefits Boosting Economic and Social Development

2.7.1 The Pharmaceutical Industry Becoming a Pillar of Economic Growth

In 2023, the added value of Chongqing's pharmaceutical manufacturing industry increased by 9.8% year-on-year, which is 2.3 percentage points higher than the average growth rate of large-scale industries, highlighting its key position in the economic structure. As a core node of the Chengdu-Chongqing economic circle, Chongqing's pharmaceutical industry is undergoing a transformation towards high value-added innovation, while driving regional coordination and resource optimization.

2.7.2 Innovation Driving Significant Employment Growth

In 2023, the number of employees in the pharmaceutical industry in the city will exceed 120,000, an increase of 18% compared to 2020, with nearly 30,000 new R&D personnel added in three years. The industrial cluster effect has given rise to upstream and downstream positions in packaging, logistics, and testing, forming an employment ecosystem centered around leading companies. Intelligent and digital applications are driving the demand for high skilled talents, upgrading vocational education and skills training, and achieving diversified and specialized employment structures.

2.7.3 The Quality and Efficiency of Public Services Continuously Improving

Chongqing's pharmaceutical innovation also promotes the development of smart healthcare formats such as medical big data and remote diagnosis and treatment, building a complete ecological chain covering research and

development, production, circulation, and application, and helping to improve the health level of the whole nation and achieve medical equity.

2.8 Innovative Environment Nurturing the Development Soil

2.8.1 The Policy Guidance Being Precise and Effective

In January 2025, the "Action Plan for Promoting the Integration and Innovation Development of Traditional Chinese Medicine Industry in Chongqing (2025-2027)" was released, focusing on the landing scenarios of digital traditional Chinese medicine trading, intelligent sharing of traditional Chinese medicine rooms, and promoting the integration of traditional Chinese medicine and modern technology. The policy not only focuses on scale expansion, but also emphasizes quality improvement and industrial chain extension.

2.8.2 The Market Environment Having Vast Potential

The concentration of the industry continues to rise, with the wholesale concentration of the top five pharmaceutical companies in China reaching 51.3% in 2023. Chongqing enterprises are actively responding, and Chongqing Pharmaceutical Holdings has built a nationwide network relying on more than 230 subsidiaries, firmly ranking among the top in the regional market. The government is building a billion dollar biopharmaceutical industry cluster with significant agglomeration effects.

2.8.3 Accelerating the Formation of Innovative Cultural Ecology

The “Chongqing Smart Medical Equipment Industry Innovation and Development Action Plan (2025-2027)” includes smart medical equipment in the city's "33618" modern manufacturing cluster, focusing on four major areas: high-end equipment, high-value consumables, in vitro diagnostics, and AI devices, effectively stimulating research and development vitality.

3. CONCLUSION

While the pharmaceutical industry in Chongqing continues to improve its policy support and platform construction, there are still bottlenecks in its innovation support capacity. Firstly, the gross profit margin of pharmaceutical and chemical raw materials is only 27%, and the total industry revenue is declining. The pressure to control costs and increase added value is prominent; Secondly, there are many Class I innovative drug projects under research, but there are few products with industrialization and market competitiveness, resulting in low conversion efficiency; Thirdly, although there is a lot of financial support, the allocation of resources is fragmented and the market-oriented collaborative mechanism needs to be strengthened; Fourthly, there have been breakthroughs in the cultivation and standard construction of traditional Chinese medicine, but the digitalization and intelligence level of the industrial chain still lags behind in the circulation and terminal application links. Optimizing resource allocation, improving conversion efficiency, and promoting modernization of the industrial chain are key issues for the future.

To enhance the overall innovation capability of Chongqing's pharmaceutical industry, it is necessary to strengthen policy guidance, consolidate basic research, jointly build and coordinate multiple parties, accelerate talent cultivation, and stimulate the vitality of the main body.

The first is to increase policy guidance efforts. It is suggested to set up a special innovation fund, focus on supporting key core technology research, promote the construction of state key laboratories and research centers, and build a regional center for pharmaceutical innovation.

The second is to stimulate the vitality of innovative entities. It is suggested to incentivize enterprises to increase their enthusiasm for research and development investment and promote industrial innovation through measures such as tax incentives, financing subsidies, and intellectual property protection. It is necessary to strengthen support for small and medium-sized innovative pharmaceutical enterprises, lower innovation barriers, and build a benign innovation ecosystem with enterprises as the main body and the market as the guide.

The third is to optimize the environment for technological innovation. It is suggested to further addressing the shortcomings of low patent authorization rate and insufficient conversion rate in Chongqing's pharmaceutical industry. There is a must to loosen the restrictions on industrial development, simplify the registration process for new drugs and devices, and shorten the approval cycle, and strengthen policy guidance and market

driven dual wheel coordination, promote the transformation of industries from scale expansion to quality improvement, and achieve innovation driven high-quality development.

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