

Postprint: A Case Study on Intellectual Property Services in Guangdong Province Boosting Biomedical Industry Development

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Abstract

[Purpose / Significance] The biopharmaceutical industry represents one of Guangdong Province's key development priorities, and its substantial reliance on intellectual property underscores the critical importance of fully leveraging intellectual property services to promote the industry's development. [Method / Process] This study examines the current development landscape of Guangdong's biopharmaceutical industry, analyzes the sector's demands for intellectual property services, and investigates existing challenges in how intellectual property services facilitate biopharmaceutical industry development. [Results / Conclusion] The findings demonstrate that enhancing macro-level promotion of intellectual property services, strengthening professional talent development, refining service provision across the industrial chain, and accelerating the establishment of an integrated industrial service system are crucial for innovating intellectual property services and fostering the sustainable growth of Guangdong's biopharmaceutical industry.

Full Text

A Case Study on the Promotion of Biopharmaceutical Industry by the Intellectual Property Service Industry in Guangdong Province

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Abstract

[Purpose/Significance] The biopharmaceutical industry is one of the key industries in Guangdong Province and exhibits strong dependence on intellectual property. Fully leveraging the role of the intellectual property service industry to boost the development of the biopharmaceutical industry is of great significance. **[Method/Process]** This study investigates the current development status of Guangdong's biopharmaceutical industry, analyzes the industry's demand for intellectual property services, and explores existing problems in how the IP service industry promotes biopharmaceutical development. **[Result/Conclusion]** The findings indicate that further enhancing macro-level promotion of the IP service industry, strengthening the construction of professional talent teams, improving industrial chain service links, and accelerating the development of an integrated industrial service system are crucial for innovating IP services and advancing the long-term development of Guangdong's biopharmaceutical industry.

Keywords: Guangdong Province; Intellectual Property Service Industry; Biopharmaceutical Industry; Case Study

1. Introduction

The biopharmaceutical industry comprises both biotechnology and pharmaceutical industries, integrating theories from multiple disciplines including life sciences, biotechnology, traditional and modern medicine, physics, and computer science [1]. China's *National Medium- and Long-Term Program for Scientific and Technological Development (2006-2020)* identified the biopharmaceutical industry as one of 11 key priority areas for national economic and social development [2]. In Guangdong's recently issued *Implementation Opinions on Implementing "Made in China 2025,"* biopharmaceuticals were also listed as one of four key industries for prioritized development. Due to the industry's strong dependence on patents and other intellectual property, fully leveraging the IP service industry to boost biopharmaceutical development is crucial for Guangdong's long-term growth. Through investigation of Guangdong's biopharmaceutical industry development status, and based on industry characteristics combined with the industrial chain segments of IP services, this study analyzes the industry's demand for IP services and subsequently explores existing problems in how IP services promote biopharmaceutical industry development.

2. Development Status of Guangdong's Biopharmaceutical Industry

According to statistical data from the *Guangdong Economic Yearbook—2015 Guangdong Pharmaceutical Industry Development* [3], Guangdong's pharmaceutical industry ranked 3rd nationwide in 2015 in terms of gross production value, sales revenue, and total profits, while ranking 4th in main business income and product exports. The province accounts for one-tenth of the nation's publicly

listed companies, topping all provinces and municipalities. Based on total pharmaceutical industrial output value, joint-stock and foreign-invested enterprises comprise over 85% of the entire industry, having essentially formed a diversified economic pattern dominated by joint-stock and foreign-funded economies. Furthermore, Guangdong leads the nation in the number of pharmaceutical enterprises and possesses several well-known traditional Chinese medicine brands with strong market competitiveness. The province's pharmaceutical preparations sector demonstrates leading domestic competitiveness, while the competitiveness of its medical device and biopharmaceutical sectors is gradually taking shape. The pharmaceutical distribution industry wields considerable influence in the domestic market, and the province is home to a number of nationally renowned pharmaceutical enterprise groups.

3. Demand Analysis of Guangdong's Biopharmaceutical Industry for IP Services

According to Guangdong's *13th Five-Year Plan for National Economic and Social Development* officially released in April 2016, the province must improve independent R&D systems in biopharmaceuticals and other industries to accelerate breakthroughs in core technologies, cultivate and strengthen emerging marine biopharmaceutical industries, and enhance domestic and international regional industrial cooperation. Therefore, considering internal and external driving factors for industrial development, industrial cultivation and agglomeration, independent R&D and innovation, industrial financing development, high-end talent introduction and cultivation, and domestic and international regional cooperation all represent focal points for Guangdong's biopharmaceutical industry development. Accordingly, this section analyzes the industry's specific demands for IP services across these five major areas.

3.1 Industrial Cultivation and Agglomeration

Guangdong's biopharmaceutical enterprises are generally small in scale, mostly producing single products, with few high-level companies and limited enterprises achieving annual sales revenue exceeding 100 million yuan. Moreover, industrial dispersion and lack of factor agglomeration constrain industry growth [4]. Therefore, cultivating and strengthening industrial clusters represents a key development priority. The corresponding IP services in this process mainly encompass four areas. First, **IP agency services** such as patent application and litigation, and patent strategic layout provide IP protection and help build IP portfolios for enterprises in industrial clusters as they expand innovative technologies and scale up R&D. Second, **IP information services** including IP information retrieval and analysis, data processing and analysis, and database construction enable analysis of IP lifecycles, domain layouts, and technology key points, providing decision-making references for industrial layout. Additionally, IP databases and systems facilitate technical exchange and cooperation among enterprises within industrial clusters. Third, **IP legal services** provide IP

protection for cluster enterprises engaging in IPOs, mergers and acquisitions, restructuring, and liquidation activities. Fourth, **IP commercialization services** primarily involve IP transactions, licensing, transformation, and operation, developing IP operation enterprises, assisting companies in IP acquisition and portfolio management, achieving centralized management and integrated utilization of IP in key technology fields, and promoting the development of IP industrialization bases, key industry patent alliances, and patent pools.

3.2 Independent R&D and Innovation

The entire biopharmaceutical industry chain primarily involves drug development (new drug R&D), drug production, pre-market approval, post-market supervision, logistics and marketing, and brand operation [5]. Possessing independent R&D and innovation capability constitutes the most critical element for industry development, with self-driven innovation advancing core technologies and promoting industrial upgrading in Guangdong's biopharmaceutical sector. The independent R&D and innovation segment involves technical research, exchange, and collaborative development among academic institutions and within and between enterprises. In these processes, auxiliary services for IP acquisition and protection are particularly vital. Related IP service demands include four key aspects. First, **IP agency services** provide IP protection for independent technological innovation and assist enterprises in clarifying innovation directions, enabling synergistic innovation between IP services and the biopharmaceutical industry chain. Second, **IP information services** help enterprises analyze, learn from, and track relevant cutting-edge technologies, facilitating breakthroughs in R&D technical challenges and enhancing R&D capabilities. Third, **IP training services** help enterprises build their own IP research teams. Since internal personnel have clearer understanding of their own technologies and communication is more timely and convenient, training services that enhance the professional quality of internal IP service personnel can more effectively embed IP services into frontline R&D processes. Fourth, **IP commercialization services**, primarily involving IP transactions, licensing, transformation, and operation, promote technology introduction, absorption, re-innovation, and transfer transformation, thereby strengthening integrated innovation and application capabilities.

3.3 Investment and Financing Mechanisms

Given the biopharmaceutical industry's characteristics of high investment, long cycles, and high risk, most institutions remain extremely cautious about investing in biopharmaceutical enterprises [6]. Guangdong's biopharmaceutical industry is no exception, as companies similarly struggle to obtain early-stage venture capital. IP-secured financing [7] represents a direct financing method that uses future asset returns as capital sources and guarantees for debt repayment. Compared with traditional banks and financial institutions that must consider the security of collateral, this new financing approach is particularly

important for early-stage biopharmaceutical enterprises. Typically, collateral security is evaluated through three aspects: the certainty of security rights, the contribution of IP to product competitiveness, and the revenue potential of the secured technology or product. This demonstrates that IP constitutes a strategic corporate resource, and IP services will play a vital role in financing. The most critical function is IP commercialization services. Conducting IP asset evaluation and value analysis, improving IP investment and financing systems, and exploring patent insurance initiatives will help promote the expansion of IP pledge financing by financial institutions, encourage financing guarantee agencies to provide guarantee services for IP pledge financing, and thereby resolve the industry's financing challenges.

3.4 Introduction and Cultivation of High-End Talent

The R&D, production, and sales of biopharmaceuticals urgently require participation from multidisciplinary, multi-level talent. IP services such as IP agency, IP training, and IP commercialization provide effective legal protection for talent's scientific and technological achievements. Simultaneously, assisting talent in IP transfer, transformation, and operation converts IP into productive forces, improves talent compensation, creates a favorable atmosphere for talent introduction and cultivation in Guangdong, and subsequently drives the development of Guangdong's biopharmaceutical industry through innovative talent.

3.5 Domestic and International Regional Cooperation

Currently, Guangdong still needs to further strengthen its efforts in introducing large multinational enterprises and enhancing regional cooperation intensity. In regional cooperation, first, IP protection for local biopharmaceutical enterprises constitutes the prerequisite for initiating collaboration. Second, strengthening IP utilization to support biopharmaceutical industry development helps circumvent biotechnology barriers, effectively plan local industrial technology layouts, and optimize development models. IP services permeate multiple segments of domestic and international regional cooperation in the biopharmaceutical industry, encompassing four main areas. First, **IP agency services**, including trademark design and registration, patent application and litigation, patent strategic layout, and overseas filing. Second, **IP information services** that clarify local enterprises' technological positioning, illuminate domestic and international biotechnology IP barriers, and monitor technological competitors. Third, **IP commercialization services** that facilitate effective partner evaluation and selection in cooperation, providing legal safeguards in technology transactions and licensing processes. Fourth, **IP consulting services** that strengthen IP early-warning functions by offering consulting on market expansion, overseas layout, core technology transfer, standardization, and mergers and reorganizations, providing decision-making foundations for government investment promotion and enterprise introduction.

4. Current Development Status of Guangdong's IP Service Industry

According to the *Guangdong Province Intellectual Property Development "13th Five-Year Plan"* released in 2016, Guangdong's IP service system is becoming increasingly complete. Specifically, construction of a demonstration province for IP service industry development has progressed steadily, with Shenzhen's Futian District and Foshan City approved as national IP service industry agglomeration development pilot zones. Guangdong has established a global patent information big data service platform. Additionally, the nation's first local standard for trademark agency services, *Trademark Agency Service Standards*, was introduced. The province has basically established copyright social service institutions covering the entire province, setting up 16 Guangdong copyright grassroots workstations and 27 work registration agencies, and establishing 16 industrial IP alliances. The ranks of IP agency, operation, commercialization, legal, and consulting service institutions continue to expand, with patent agency business levels and service capabilities continuously improving. As of 2015, the province had 158 patent agencies, 164 branch offices, and 1,455 patent agents, while trademark agencies reached 4,659, ranking nationally... Overall, Guangdong's IP service industry has achieved initial success, basically forming a comprehensive service chain covering IP agency, retrieval, transfer, pledge, and rights protection. However, problems persist, including insufficient policy support, small development scale, lack of leading enterprises, unbalanced development, and low specialization [8].

5. Problems in IP Services Promoting Biopharmaceutical Industry Development

5.1 Insufficient Macro-Level Promotion

The IP service industry is still regarded by government, enterprises, and society as a subordinate service sector, rather than being recognized as a leading force in driving IP and technological development and promoting industrial upgrading and transformation. The industry suffers from severe lack of awareness across broad social groups, including within Guangdong's biopharmaceutical industry. Therefore, urgent efforts are needed to enhance the promotion and popularization of IP services and strengthen the industry's recognition of the IP service sector's importance.

5.2 Lack of Professional Talent

The IP service talent pool urgently needs strengthening. As an emerging industry, IP services have few professional training institutions, weak cultivation efforts, insufficient channels and intensity for talent attraction, and a particular lack of backbone talent. Moreover, among professional IP service teams, personnel with strong professional backgrounds in biopharmaceutical-related technologies and long-term technology tracking experience are extremely rare.

Consequently, when embedding IP services into Guangdong's biopharmaceutical industry chain, service communication efficiency and effectiveness are constrained by talent limitations. Therefore, the introduction, cultivation, and development of professional talent, particularly dual-domain experts, are crucial for the IP service industry to assist in developing Guangdong's biopharmaceutical industry.

5.3 Incomplete Industrial Chain Development

Guangdong's IP service industry advantages are concentrated primarily in agency, information, and legal services, while commercialization, consulting, and training remain relatively weak. Service content is not yet comprehensive, and high-end IP services that lead strategic development, technological advancement, capital operations, and securitization are far from developed. In particular, high value-added IP service segments are notably weak, such as foreign-related agency and legal services, strategic consulting, and project risk early-warning consulting services. These deficiencies make it difficult to meet the growing IP service demands of Guangdong's biopharmaceutical industry.

5.4 Low Integration Between IP Services and Biopharmaceutical Industry

Currently, IP creation, utilization, protection, and management services are still regarded as singular service activities with low integration with biopharmaceutical industry development. As the IP service industry remains in its initial development stage, it lacks experience in aligning with industrial chains and providing tailored services for industry growth. Additionally, platform construction is deficient; for instance, Guangdong has yet to establish a service platform that aggregates various IP service institutions, promotes IP services corresponding to biopharmaceutical industry activities, and facilitates IP-industry service matchmaking. The degree of integration needs substantial improvement.

6. Recommendations for IP Services to Promote Biopharmaceutical Industry Development

6.1 Strengthen Publicity and Guidance of IP Services

Promote the development of IP service industry associations and fully leverage their roles. Simultaneously, utilize new media to popularize IP service industry information among all parties in the biopharmaceutical industry chain. Conduct multi-angle publicity covering IP service content, service models, and industry chain promotion mechanisms, combining theory with successful practice cases to enhance awareness of the importance and operability of IP services among biopharmaceutical industry chain participants.

6.2 Enhance Talent Team Construction

On one hand, develop vocational training for Guangdong's IP service industry through establishing professional training systems, participating in vocational training, and conference exchanges to systematically improve IP service personnel's professional competence and skill levels, while supporting multi-form, multi-channel talent introduction. On the other hand, segment the biopharmaceutical industry into modules, assign dedicated personnel for long-term specialized technology tracking in each module, and continuously conduct in-depth learning of biopharmaceutical industry-related professional knowledge to gradually cultivate dual-domain professional talent.

6.3 Promote Service Platform Construction

The 'Internet Plus' initiative presents new opportunities for numerous industries, and IP services are no exception. Advancing IP service platform construction will enhance the industrial permeability of IP services. By integrating IP service industry resources and leveraging advanced internet technologies, Guangdong should establish a 'Guangdong Province Intellectual Property Service Platform' that aggregates information on provincial IP service institutions, promotes IP services for the biopharmaceutical industry, and facilitates IP-industry service matchmaking. This platform will enable service processes to become systematic, refined, and scientific during IP-driven biopharmaceutical industry development, while simultaneously improving service-industry integration and efficiency.

7. Conclusion

Currently, Guangdong's biopharmaceutical industry has achieved remarkable construction success and exhibits extensive demand for IP services as its industrial system becomes increasingly complete. However, several non-negligible problems persist in how the IP service industry promotes Guangdong's biopharmaceutical development. Based on the analysis, strengthening IP service publicity and guidance, enhancing talent team construction, and advancing service platform development are crucial for innovating IP services and promoting the long-term development of Guangdong's biopharmaceutical industry.

References

- [1] Xu Yan. Research on the Technological Innovation Path of Jilin Province's Biopharmaceutical Industry[D]. Changchun: Jilin University, 2014.
- [2] Liu Xiaoqing. Biopharmaceutical Industry—An Opportunity for Guangdong's Future Development[J]. Guangdong Science and Technology, 2016(Supplement 1): 56-59.
- [3] Zhang Junxiu, Zhong Hua. Guangdong Economic Yearbook—Development of Guangdong's Pharmaceutical Industry in 2015[EB/OL]. [2016-12-30].

<http://www.gdjjxx.com/a/2016guangdongjingjixiezuogaofengluntan/2016/0829/5514.html>.

[4] Du Saihua. Research on the Development of Guangdong's Biopharmaceutical Industry[J]. Science and Technology Information Development and Economy, 2013, 23(8): 150-152.

[5] Shenzhen Life Science and Biotechnology Association. Research Report on the Development of Shenzhen's Biopharmaceutical Industry (2015)[EB/OL]. [2016-12-30]. <http://www.szsti.gov.cn/f/services/softscience/155.pdf>.

[6] Zhou Pin, Rao Haohan. Venture Capital: An Effective Financing Channel for China's Biopharmaceutical Industry[J]. China After-school Education, 2016(30): 126-128.

[7] Sun Xiaoling, Cheng Jianming. Financing for Small and Medium-sized Enterprises[M]. Beijing: Tsinghua University Press, 2016: 71.

[8] Chen Yuping, Wei Qinghua, Zhang Ying, et al. Research on Development Strategies for Guangdong's Intellectual Property Service Industry[J]. Guangdong Science and Technology, 2015, 20(10): 21-24.

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