

Study on the Present Situation and Development Countermeasures of the Biomedical Industry in Hubei Province

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Abstract: the pharmaceutical industry is closely related to people's life and health, quality of life, related to the national economy and people's livelihood, is an important part of the national economy, with the continuous development of modern biotechnology, biomedicine has become a new economic growth point of the pharmaceutical industry. Hubei province keeps up with the development trend of The Times. After continuous development, the biomedicine industry of this province has a certain scale, but there are some problems in the fierce market competition: the industrial structure is complete, but the product innovation is insufficient; Industrial clusters are basically formed, but their overall competitiveness is limited. Chinese herbal medicine resources are rich, but brand awareness is not strong, lack of competitiveness. This paper intends to analyze the current situation of the biomedical industry in Hubei province, and propose countermeasures to the existing problems, so as to provide reference for the further development of the biomedical industry in Hubei province.

1. Introduction

With the continuous development and wide application of modern biotechnology, it has become one of the most growing high-tech industries in the 21st century. It is a typical knowledge, technology and capital intensive Industry with high investment, high yield, high risk and high return [1]. As one of the key strategic emerging industries in China's "13th five-year plan", the biomedical industry has an important position and role as it relates to the national economy and people's livelihood. From 2018 to 2024, China's biological drugs will continue to develop at a high speed, and the market size will reach 333.3 billion Yuan by 2020, with a compound growth rate of 18.1%. According to its own development advantages and actively respond to the national policy call, after years of development, the development of the biomedical industry has begun to take shape in Hubei province, but in the process of development and exploration also revealed some problems.

2. Current Situation of Biomedical Industry in Hubei Province

2.1. Complete Industrial Structure, but Insufficient Product Innovation

After years of development, the pharmaceutical industry in Hubei province is complete, including

biological medicine, chemical synthesis of raw materials and preparations, Chinese patent medicine, Chinese herbal pieces, health materials, medical equipment, pharmaceutical machinery and pharmaceutical packaging and other categories [2]. Hubei pharmaceutical manufacturing enterprises are developing rapidly, and some products and technologies are in a leading position at home and abroad: the output of B vitamins accounts for 60% of the country, and the export volume accounts for 50%. Among them, the new strain technology of vitamin B2 has reached the international leading level, and its output accounts for 98% of the whole country. Its production capacity is the first in China and the third in the world. There are 16 kinds of amino acid series products exported, 3 of them can fill the domestic blank, can replace the import; The production of ibuprofen is the first in China and the fourth in the world [1], in addition, the research in some fields, such as bioengineered vaccines, functional genes and artificial growth factors, has also reached the domestic and international advanced level. Based on the special geographical and geographical advantages of traditional Chinese medicine culture, Hubei province has formed several authentic traditional Chinese medicine cultivation bases. Other types of pharmaceutical industrial bases, such as pharmaceutical production and pharmaceutical scientific research, have also been formed and continuously developed.

In 2017, the total industrial output value of the province's biological industry reached 228.725 billion Yuan (excluding biological agriculture), up 15.9% year-on-year. In the first eight months of 2018, the total industrial output of the province's biological industry reached about 170 billion Yuan, maintaining the rapid growth since the 13th five-year plan [3]. However, due to the high investment, long cycle and high risk of innovative drug research and development, as well as the insufficient capital strength, most pharmaceutical enterprises in our province do not invest enough in innovative drugs. Most of the drugs in circulation are generic, with numerous homogeneous products, fierce competition and limited profits. The lack of industrialization of scientific research results in the disconnection of upstream and downstream technologies. In 2018, the number of new drug approvals for drug registration across the province will be zero.

2.2. Industrial clusters are basically formed, but their overall competitiveness is limited

The establishment of "Wuhan national biological industry base" has promoted the development of the province's biological medicine industry to a large extent. Pfizer, Bayer and other large pharmaceutical companies have entered. Berlin chemical set up headquarters of China in Biolake, Sinopharm Group has also set up production base in Wuhan, building China medicine group production base in central China. At the same time, China and the United States Huashitong pharmaceutical, Canada natural pharmaceutical and other international innovative team [4]. In addition, Bio-pharmaceutical industry cluster based on bio-pharmaceuticals (E Zhou), Qi Chun -- a medical industry cluster focusing on traditional Chinese medicinal materials and processing, pharmaceutical industry cluster (Tian Men), which mainly focuses on pharmaceutical preparations, has begun to take shape. And 1+8 biological medicine industrial park pattern has been formed [5].

Generally speaking, the overall scale of the pharmaceutical industry in our province is relatively small, with many small and medium-sized enterprises, low industry concentration, limited technology level, and relatively lack of large biotechnology leading enterprises. The biomedical industry cluster lacks of centralization, leading enterprises, leading products and obvious brand effect [6]. Within the cluster, the inter-firm correlation is not high, the technology development is loose, the innovation sharing mechanism is not integrated enough, and the cooperation efficiency of the industrial cluster needs to be improved. The industrial chain assimilation within the cluster lacks reasonable planning and division of labor, which affects the innovation ability and competitive advantage of the park.

2.3. Our Province is Rich in Traditional Chinese Medicine Resources, but Lacks Strong Brand Awareness and Competitiveness

Hubei province is located in the middle reaches of the Yangtze River, with mountains, hills, plains, rivers and lakes, forming the pattern of "seven mountains and one water divided into two fields". The province has about 3,970 kinds of traditional Chinese medicine resources, ranking the fourth in China, and the wild drug content ranks the 11th in China. Hubei has six growing areas of traditional Chinese medicine, including Wuling Mountain, Dabie Mountains, Shennongjia and three gorges. The output of traditional Chinese medicine ranks the sixth in China, producing authentic Chinese medicine such as *poria cocos*, *eucommia ulmoides* and *platycodon grandiflorum*. Of the 60 traditional Chinese geo-authentic crude drugs selected by the state, nine are from Hubei. There are many universities and scientific research institutes with the foundation of resource development. [7]

The organization degree and market degree of traditional Chinese medicine industry in Hubei province are not enough. Most of them are cultivated in families, lacking of unified organization and planning. At present, there is only one Qizhou traditional Chinese medicine market with a large scale in our province. [8] In addition, the planting starting point of medicinal materials in our province is relatively low, the varieties of medicinal materials certified by GAP are limited, and there is a big gap between GAP base and variety certification in other provinces and cities. Although there are nearly 100 processing enterprises of traditional Chinese medicinal materials in our province, they are involved in primary processing of medicinal materials, with low added value and limited profit.

3. Development Strategy of Biomedical Industry in Hubei Province

3.1. Increase the Investment in the Research and Development of Original Drugs and Carry out Technological Innovation

Scholars found that the technological innovation ability of China's pharmaceutical manufacturing industry is unbalanced in various regions, with strong innovation ability in the eastern coastal areas and weak innovation ability in the central and western regions. The overall level of pharmaceutical technology innovation ability of Hubei province is general. In 1995, its comprehensive innovation ability ranked the 12th in China. In 2000, its rapid progress ranked the 6th. From the comprehensive score and ranking of the technological innovation ability of the pharmaceutical manufacturing industry, the five provinces of Shanghai, Jiangsu, Zhejiang and Guangdong were consistently stronger than Hubei province from 1995 to 2010, and Hubei province only belongs to the category with strong innovation ability in the cluster analysis of innovation ability [9].

Biomedical innovation is a high-input project. It takes an average of 15 years and \$800 million to \$1 billion for the development and marketing of original drugs. Research and development investment of American pharmaceutical companies generally accounts for about 20% of sales revenue [10], while that of China is only 1%. The insufficient research and development investment is mainly affected by the low sales revenue. Our province can realize capital merger and reorganization by means of capital increase and share expansion, merger and acquisition of equity and property rights, and revitalization of stock assets. Attract foreign large pharmaceutical enterprises to enter Hubei province by attracting investment, cultivate leading enterprises with foreign capital, enhance the technological innovation ability of pharmaceutical enterprises in our province, enlarge the economic aggregate and industrial scale of pharmaceutical industry, and realize industrial upgrading as soon as possible.

3.2. Optimize the Construction of Biomedical Industry Group and Drive the Development of the Industry with the Advantages of the Industry Group

Biotechnology parks are gathering place for the development of biotechnology and traditional Chinese medicine industry, as well as a major promoter and promoter of its development. There are many bio-pharmaceutical industry clusters abroad, such as Los Angeles of the United States, Denmark's "biological valley" and so on. The United States is the most important agglomeration of the global biomedical industry, with its annual sales accounting for about 50% of the global pharmaceutical market. The biomedical clusters in the United States are worth learning from in terms of industrial chain, capital source and operation, organization and management, park environment and location selection.

Hubei province has a large number of biotechnology and new medicine research institutions, high scientific research strength and level, and the biomedical industry group has begun to take shape [11]. It is suggested to accelerate the construction of industrial clusters from the following aspects: first, to actively promote the construction of public service platform and improve the service mode of industrial clusters. In addition to organizing, guiding and coordinating in various aspects through government policy support, it also provides public laboratories, technical service platforms, new drug research and development information and patent service institutions and other facilities. In addition, a diversified venture investment mechanism and investment and financing platform should be established to provide services for small in the cluster to apply for capital loans. The second is to cultivate a distinctive regional mode of biomedical industry cluster through reasonable positioning. The positioning of each park should be different to avoid repeated construction and competition for resources, take full account of the park's comparative advantages in technology, talents and resources, and make use of the "spillover effect" of talents and technology to select a scientific and reasonable development positioning and rational division of labor according to local conditions. It is suggested to integrate the resources of Wuhan east lake high-tech, Ezhou, Gedian and other economic development zones, and re-plan to avoid duplicate construction of the park infrastructure. It is suggested to extend the radius of Biolake to Shennongjia, northwest Hubei and other areas with abundant medicinal materials. Contact the enterprises producing TCM external medicine with Mayinglong Pharm as the main body, and form the TCM industrial cluster with the horizontal integration of TCM planting, processing, medicine and health care. Third, increase cooperation between industry, university and research institutes, accelerate the transformation of scientific and technological achievements, and promote the agglomeration effect of the park. The main body of biomedical research and development in China is mostly scientific research institutes and institutions of higher learning. Policy guidance should be adopted to actively build platforms for various types of technological innovation and achievements transformation, and promote the combination of industry, education and research, so as to speed up the transformation of scientific and technological achievements. The province should gradually establish a biomedical technology innovation system with enterprises as the main body and the combination of production, education and research.

3.3. Establish Value Chain of Traditional Chinese Medicine Industry and Establish Brand Awareness

With unique resource advantages, Hubei province is trying to transform itself from a big province of traditional Chinese medicine to a strong province of traditional Chinese medicine, but it is still at the upstream of the whole industry chain. There is no complete value chain of planting, processing, research and development, preparation and marketization in the TCM industry. Basically still be in simple plant, process a link, the enterprise innovates inadequacy, lack competition ability. Therefore,

it is necessary to strengthen preparation and marketization in the value chain of Chinese medicinal materials industry, so as to improve the competitiveness of enterprises and enhance economic benefits. The protection of wild Chinese medicinal materials resources and the cultivation of medicinal materials will be strengthened, GAP certification will be strengthened in the planting process, and the quality and competitiveness of medicinal materials will be improved from the source. For geo-authentic crude drugs, the government shall provide technical and information guidance, set up professional cooperatives and industrialize the cultivation of medicinal materials on a large scale [12]. Strengthen the construction of professional markets and information platforms, update market information in a timely manner and control price fluctuations. According to the characteristics of traditional Chinese medicinal materials, the advantages of prevention and intervention in the treatment of diseases are explored, and the research and development of preventive drugs and drugs for the treatment of chronic diseases are strengthened. Taking advantage of the profound traditional Chinese medicine cultural deposits in this province, the cultural industry will promote the marketization of traditional Chinese medicine products, vigorously develop new traditional Chinese medicine products such as traditional Chinese medicine health care products and skin care products, and expand the industrial value chain.

The awareness of patent application protection of medical biology in China needs to be improved urgently [13], and the patent protection of wild medicinal materials and traditional Chinese medicine formulations needs to be strengthened. Domestic patent applications for Chinese medicinal materials cover a wide range of varieties, most of which are varieties with high demand but limited output or high social benefits, such as dendrobium and Chinese yew. Our province should strengthen the protection and utilization of genetic resources and protect the medicinal plant and animal resources with patent. For traditional Chinese compound medicines, to give a positive patent protection, control the risk of group being counterfeited, government departments can organize the relevant experts to the traditional Chinese medicine formula particularity, appropriate adjustments to modify the patent law, make it more suitable for Chinese traditional medicine formula patent protection, to enhance the brand awareness of the enterprise, forms the enterprise's unique competitive advantage.

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