



Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

How to enhance China's biopharmaceutical industry competitiveness

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ABSTRACT

Chinese biopharmaceutical industry is developing rapidly; however, the amount of capital investment and the industry concentration is still low. In order to improve competitiveness of China's biopharmaceutical industry, Chinese government issued a number of supporting policies, such as the release of the Twelfth Five-Year Plan for Biopharmaceutical Industry and the implementation of New Medical Reform. This paper summarized the current situation, a number of government support policies combining the influence of the New Medical Reform of China's biopharmaceutical industry, and provided the suggestion that China should speed up industrial upgrading for biopharmaceutical industry, introduce the cooperation research and development mode between enterprises and universities, pay more attention to patents application and protection to achieve breakthroughs for the industrial competitiveness of China's biopharmaceutical industry.

Key words: Biopharmaceutical industry; industrial competitiveness; development situation; opportunity

INTRODUCTION

Biotechnology is the application of the biological engineering technology to the field of drug manufacture. In a broad sense, the biopharmaceutical industry includes all associated fields such as drugs and medical equipment development, production and circulation; in a narrow sense, the biopharmaceutical industry refers only to the biopharmaceutical industry itself. [1] The purpose of this paper is to put forward some suggestions on the development of China's biopharmaceutical industry and provide suggestions for the development of China's biopharmaceutical industry.

DEVELOPMENT SITUATION OF THE CHINA'S BIOPHARMACEUTICAL INDUSTRY

1.1 . Main Characteristics of Biopharmaceutical Industry

The biopharmaceutical products are the biological activation preparation taking microbial, animal toxins, animal cells and biological tissues as starting materials, purification technology preparation by biological process or separation technology. The complete biopharmaceutical industry chain model relates to several key processes, including research and development, raw material medicine production, synthetic drug production, logistics and marketing and brand operation. The details are show in figure 1.

Compared with the traditional medicine products, biopharmaceutical products have less pollution to the environment, less dependent on the resources. They have good targeting property to the disease with less toxic side effect. However, they have relatively high requirements for the technology, thus the profit is relatively high. Additionally, the scale of the enterprises is small and lack of funds. Therefore, more than 90% of current more than 400 biopharmaceutical enterprises in China imitate foreign products majorly with rarely independent innovation products and less core competitiveness[2]. In the global biotechnology patents, American, Europe and Japan accounted for 59%, 19% and 17% respectively, while developing countries including China accounted for only 5% [3].

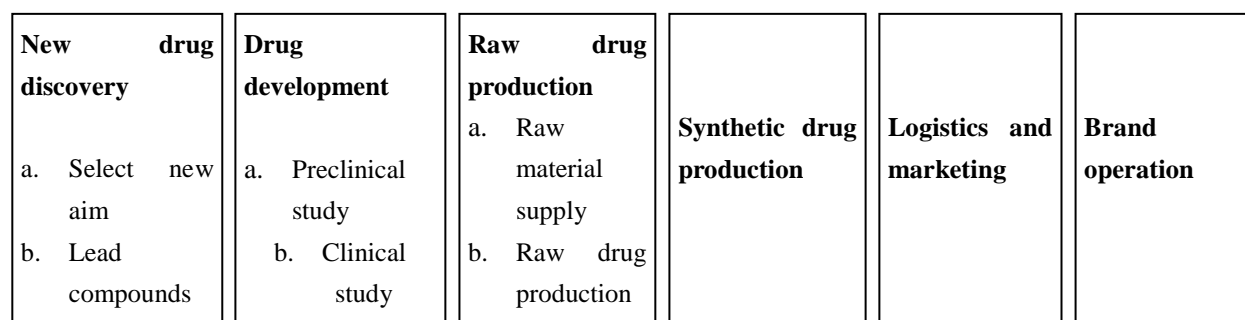


Fig.1: Complete biopharmaceutical industry chain

1.2. Overall Situation

The start and development of China's biopharmaceutical industry is late. Since the release of the national "863", "973" high technology program and National Natural Science Foundation, China's biopharmaceutical industry has rapid development. In the past 30 years, the gap between China's biopharmaceutical industry and foreign countries is gradually narrowing. The research for functional gene group, stem cell, bio chip and so on is already entered the ranks of the international first-class. Since 1998, the global biopharmaceutical industry annual sales growth rate maintained between 15% and 33% for a decade since 1998 which become one of the fastest growing high-tech industry [4]. During Nine Five period, China's pharmaceutical industry growth rate is accelerated year by year with annual growth rate between 15 and 20% [5]. According to the China's industry information network statistics, the biopharmaceutical industry output value of 76.87 billion RMB with a year-on-year growth of 30.60% in 2008 which is higher than that of the pharmaceutical industry. The output value of China's biopharmaceutical industry accounted for 8.9% of that of pharmaceutical industry; in 2009 the total output value reached 88.72 billion RMB, with a year-on-year growth of 29.1%.

China's biopharmaceutical industry has big gap compared with foreign pharmaceutical giant with regarding to technology, personnel, equipment and industrial structure. In 2008, new drug research and development funds invested a total of 31 billion dollars for the global top five biopharmaceutical enterprises; in 2010, it reached 41.6 billion dollars, while Chinese invested a total of 0.27 billion dollars on new drug research and development in 2008-2010. In the global value chain, innovation and marketing brand operation has higher added value. Most of biopharmaceutical industrial cluster in Europe and American are in the R & D innovation stage and drug marketing and brand operation stage the value chain. According to statistics, the investment of big pharmaceuticals company in Europe and American on the research and development is about 16% to 17% of its sales. The innovation capability of most of China's biological medicine industrial cluster is low with less brand effect. Most of them are in the low stage of raw material medicine manufacturing stage in a value [6]. The value chain of biopharmaceutical industry is U shape smile curve, refer to Figure 2.

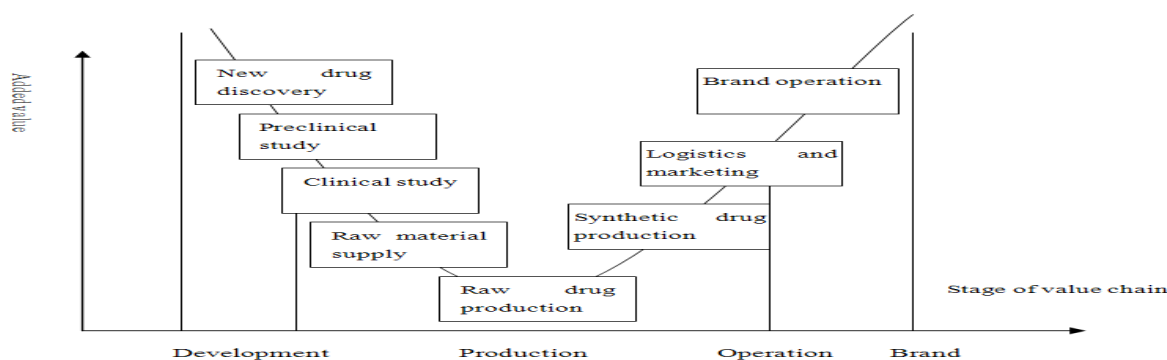


Fig.2: value chain of biopharmaceutical industry

2.1. Biopharmaceutical Industry can meet the Requirements of Chinese Social Development

A large amount raw material medicine is the main part of the export for China's biopharmaceutical products. Compared to preparation, raw material medicine has high pollution and energy consume. It has great potential cost. The manufacturing of the raw material medicine is at the low position of the industry chain with low added value. The development of biopharmaceutical is a feasible method for Chinese to promote for resource utilization from extensive form to intensive form.

2.2. Strong Support in Government Policy Aspect

The steady development of China's biopharmaceutical industry is accompanied by putting a high value by Chinese government. Early biological technology policy started from the release of Blue Book, 863 and 973 high technology planning that opened the prelude for fast development of biological medicine industry. In April 2007, the Eleventh Five-year Plan for Biological Technology Development was issued, which was the first time to stress biopharmaceutical industry as an important strategic industry of national economy and social development. In October 2010, the State Council's Decision on Accelerating the Fostering and Development of Strategic Emerging Industries was formally issued, which defined biotechnology industry as one of the seven strategic industries. In 2011, China issued the Twelfth Five-year Plan for Biological Technology, which set the average annual growth rate of output value of biopharmaceutical industry kept at more than 15%. In the science and technology policy aspect, Chinese government would increase investment in basic scientific research and enterprises' scientific research, reduce the risk of enterprise development, which provided the safeguard for the enterprise independent innovation products. In tax policy aspect, biopharmaceutical industry also could benefit from preferential policies in value added tax, business tax, enterprise income tax, personal income tax aspects. For example, in order to encourage the export of biopharmaceutical products the export tax rebate rate from 13% to 17%. Under this situation, a number of traditional China Medicines companies have transferred the business scope to the biopharmaceutical industry.

2.3. New Medical Reform Promote Industrial Development

With the implementation of the New Medical Reform, the increase of coverage of urban resident basic medical insurance, the expanding of domestic pharmaceutical market, China's pharmaceutical industry maintain a rapid and steady development. The Chinese government relaxed related policy of social capital and foreign capital to enter the medical institutions and pharmaceutical enterprises.

ADVICES TO PROMOTE INDUSTRIAL COMPETITIVENESS CHINA'S BIOPHARMACEUTICAL INDUSTRY

Biopharmaceutical industry has become one of the Chinese industries with prospect future and fast growth because of the need of the society, the favourable policies and national stress. China's biopharmaceutical enterprises shall pay more attention on the following aspects in order to occupy of the commanding heights of biopharmaceutical target in the Twelfth Five-Year Plan period.

3.1. Achieve Seamless Transfer between R & D and Industrialization

Although China universities and institutes have lots of scientific research personnel engaging in biopharmaceutical R & D work, most of the achievements cannot realize industrialization; while biopharmaceutical enterprises are eager to get the achievements which can realize industrialization but limited by their R & D capability and various constraints compared to universities and institutes. Therefore, both of universities and enterprises can cooperate according to their own characteristics to achieve a kind of win-win result. The enterprises can get more valuable market knowledge with less investment; universities and institutes can get investment support from enterprises enhancing the ability to grasp the market and achieve technology commercialization.

3.2. Accelerate Industrial Upgrading

Industrial upgrading shall be speedup in order to change current situation that the scale of the enterprises are small, primer products are in excess of production capacity, high-end products are in short supply, the whole industry is big but not strong in order to accelerate the industry consolidation and mergers and finally promote the competitiveness of complete biopharmaceutical industry. Industrial upgrading is refers to the improvement of industrial structure, industrial quality and efficiency with the core of rebuilding the traditional industry with advanced and practical technology. At the same time, the implementation of the new standard will eliminate some small enterprises lack of, and finally accelerate industrial upgrading process. In addition, high level talents are also a key of industry upgrading. If overseas Chinese scientists and scholars can be attracted to engage in drug research and development work in the engaged in research work, then enterprises' R & D strength can promoted.

3.3. Create Patent Strategy

The patent strategy means that the enterprises adopt patent system, patent technology, patent information, research competitors based on long-term strategic goal to obtain the competition advantage in the competition. In the biopharmaceutical enterprises, patent has become the most valuable assets instead of equipment, workshop and so on. Furthermore, patent has become the core index for evaluation of biopharmaceutical enterprises' competitiveness. Biopharmaceutical enterprises can develop sustainably only if they have a large number of high quality patents to form advantages in technical and market aspects. In 2010, Suzhou established the first domestic biological medicine patent database, to provide intellectual property public service for bio pharmaceutical enterprises. It can be foreseen that there will be more and more biology medicine patent database domestic along with the development of the China's biopharmaceutical industry. Biopharmaceutical enterprises can reduce the investment both in capital and

time, to avoid duplication of development, and finally get the leading position via the adoption of the patent strategy.

3.4. Develop R & D Outsourcing

R & D outsourcing is an important part of new drug research and development. For spending cuts, biopharmaceutical enterprises overseas will peel off the non-core part of the research and development and transfer to low cost countries. The quantity of enterprises in China accepted the R & D outsourcing reached more than 2000, but the overall scale is small. A part of the powerful enterprises do not pay attention to outsourcing service. The proportion of output value of the outsourcing development is very small compared to the overall output of the enterprises. Although the core part of drug development cannot be reached via the research outsourcing, but the experiences learnt is of help to independent research and development. With the opportunity of R & D outsourcing, China's biopharmaceutical enterprises can learn advanced technology and management methods to promote the industrial competitiveness.

CONCLUSION

The biopharmaceutical industry is one of the most promising industries in this century. Many countries have defined the biopharmaceutical industry as one of the priority development of the strategic industry. Chinese continuously stress the bio pharmaceutical industry with increasing policy support and capital investment in the biopharmaceutical industry in recent years. But just rely on the government's support is still far from enough, China's biopharmaceutical industry also need to seize the current opportunity for breakthrough in industrial structure, patent technology and research and development level aspects to really improve the China's biopharmaceutical industry competitiveness.

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