

# *The Present Situation and Countermeasure Analysis of Chinese Biological Medicine Industry Development*

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**Keywords:** China, Biological medicine, Industry development, Measures

**Abstract:** As China's economic power has been increasing since the reforming and opening up, biological medicine industry gets rapid development, the position in national economy system has been gradually increased, biological medicine industry is an important industry in people's life and health. With the improvement of people's health consciousness, to promote the growing demand for the medicine, all countries has put more and more attention in the development of medical field, the modern biological medicine industry has entered the stage of rapid development. Biological medicine industry is known as the most potential and competitive "sunrise industry" in 21st century, and also known as one of the strategic emerging industries in China to achieve the target of "scientific development, carry catch up, green rise". Combined with Chinese advantages such like that, medicinal herbs is sufficient, the industrial cluster effect is obvious, leading enterprise benefit is highlighted and the new drug varieties is increasing year by year, how to grasp the trend of biomedical technology, rationally allocate the resources of science and technology, accurately choose the priority of industry development areas, which makes great importance to the development of China's future.

## **1. The Global Pharmaceutical Industry Development Situation**

### **1.1. The Global Pharmaceutical Industry Development Situation**

As one of the world-recognized most promising high-tech industry, the pharmaceutical industry has maintained a rapid growth momentum. Since the 1950s, the global pharmaceutical market has begun to accelerate the development and reached a growth peak in the 70s, the average annual growth rate was 13.8% and 8.5% in the 80 s. After the 90s, global economic growth has slowed down, but the global pharmaceutical market has always maintained a good development momentum, according to IMS statistics, which shows that: from 2006 to 2011, the global pharmaceutical market scale growth from \$702 billion to \$942 billion, the average annual growth rate is 6.06% [1].

Although global drug sales continue to grow in 2011, but its growth rate have been slowed down from recent high of 9.1% in 2003 to 5.1% in 2011. Among them, the use of generic drugs and the rise of emerging markets has significant effects on drug market, in 2011, the growth rate of pharmaceutical market is between 12% and 13%, however the growth of pharmaceutical market in developed countries is only about 2% to 5%.

According to the latest forecast of IMS, the global pharmaceuticals market will demonstrate the following three characteristics: owing to the patent medicine expiration and a new round of budget tightening ,the growth of pharmaceutical market in the developed countries has been slowed down; the contributions that Emerging countries medical market make to the global pharmaceutical market growth will be close to 50%, China will become the world's third largest pharmaceutical market; Innovation will give birth to new drug treatment method and means. At the same time, according to the latest forecast of IMS in 2012, from 2012 to 2015, the average annual growth rate of global pharmaceuticals market was between 3% and 6%, lower than the former forecast of 5% to 8%, with the market growth in developed countries was 2-5% and 11-14% in developing countries

## 1.2. The Characteristics of the Global Pharmaceutical Industry

First, the pharmaceutical industry is a typical highly-invested industry. Early research and development of pharmaceutical products require huge capital investment, especially in new drug research and development, there is a statement called "the three decade" about new drug research and development in the world, the time of research and development of any new drugs is more than 10 years, R&D spending is more than \$1 billion, while the research and development success rate is less than 10% [2]. Every year, the world famous pharmaceutical companies invest a lot of money in the research and development of new drug, R&D input in the sales accounts for more than 10%.

Table 1: R&D expenditure proportion in revenues pharmaceutical enterprise in 2013(\$)

Manufacturer	Sales revenue	R&D input	proportion
Novartis	538.56	98.52	18.3%
Pfizer	482.42	66.78	13.8%
Roche	403.89	99.10	24.5%
Johnson	281.25	81.83	29.1%
Lilly	209.61	55.31	26.4%
GSK	404.47	65.18	16.1%
Amgen	186.76	39.29	21.0%
Bristol-myers squibb	163.85	37.31	22.8%
Novo nordisk	152.37	21.78	14.3%

Source: Companiese annual reports in 2003

According to Table 1, R&D input of each big drug firms is more than 10%, the Johnson & Johnson, Eli-lilly, Amgen, Bristol-myers Squibb companies are more than 20%.

Second, the pharmaceutical industry is a high-risk industry. The pharmaceutical industry is a relatively high-risk industry, mainly reflects in the new drug research and development and all kinds of listed risks. As it is put earlier ,the characteristics of the "three 10", the time for research and

development of each new drug is more than 10 years, R&D spending is more than \$1 billion, and the research and development success rate is less than 10%. Every year we spend a lot of money on research and development and the success rate is less than 10%, when the research and development of a new drug has listed, new drug patent is timeliness, the monopoly is temporary, once the patents expire, there will be a variety of generic drugs, the competitive advantage of new drugs will decrease rapidly. Drugs, on the other hand, due to the particularity of its effects on the human body, once its serious side effects has been found after its listing , soon will it be eliminated by the market

Take the Pfizer's sales situation in 2004-2012 as an example, from Table 2, we can see the Pfizer's profit fluctuation is very big, the growth rate is sometimes high and sometimes low, with up to 190.5% in 2004, while the negative growth in 2005 is 28.8%, Although the average profit is \$10.722 billion among this nine years, only 34.58% of average growth rate is affected by high risk. As the world's top ten large multinational drug companies did so, we can clearly know that the pharmaceutical industry is a high- risk industry.

Table 2: Pfizer profit and growth rate in 2004-2012

Year	Profit	Growth rate
2004	113.6	190.5%
2005	80.9	-28.8%
2006	193.3	138.9%
2007	81.44	-57.9%
2008	81.04	-0.5%
2009	86.35	6.6%
2010	82.57	-4.4%
2011	100.09	21.2%
2012	145.70	45.6%

Source: The earnings statistics of Pfizer in 2004-2012

Third, the pharmaceutical industry is a highly-tech industry. The development of medicine industry is processing day by day, which give birth to a lot of new technology and new equipment, new dosage form also greatly improve the utilization efficiency of the drug. Almost all major technological products has been applied, such as computer technology, laser technology, radiation technology, electromagnetic technology and so on, especially with the development of biotechnology in recent years, which push the development of medicine industry to a new height. At the same time, due to the high technology in pharmaceutical industry directly relates to human life and health, its scientific and technological achievements conversion rate is higher, therefore, the pharmaceutical industry is a comprehensive interdisciplinary high technology industry.

Fourth, the pharmaceutical industry is an industry which can create relatively high added value. Drug has been implementing the patent protection, a new drug can enjoy the market monopoly during the life of the patent after being developed, due to its huge investment on the research and development, once approved, it will get the technology monopoly, which will give appearance to high prices and great rewards to the firms, sometimes a pharmaceutical enterprise fist product sales can account for nearly half of all sales company, as shown in Table 3.

Table 3: Various pharmaceutical enterprise first product sales proportion (US \$)

Manufacturer	Sales avenue	First product sales avenues	proportion
Nonartis	538.56	46.93	8.71%
Pfizer	482.42	45.95	9.52%
Roche	403.89	69.51	17.21%
Johnson	281.25	66.73	23.73%
Lilly	209.61	50.84	24.25%
GSK	187.90	106.59	56.73%
Amgen	186.76	57.90	31.00%
Bristol-myers squibb	163.85	22.89	13.97%
Novo nordisk	152.37	30.72	20.16%

Source: the financial statements of companies in 2013

Fifth, developed countries lead global pharmaceutical industry, emerging market expand rapidly. Take a look at the composition of the global drug market, North America led by the United States, Europe and Japan, these three big pharmaceuticals market take a share of nearly 80%, the share of Asia (except Japan)/Africa/Australia's market increase quickly, reached to 14.7% in 2009. From the perspective of the distribution of global pharmaceutical producing enterprises, pharmaceutical products all over the world which take more than 60% share of the top 20 large companies are the developed countries. In recent years, mature markets usually are these five medical market of the United States, Europe (France, Germany, Italy, Spain and Britain) and Japanese drug market, their scale growth has slowed down, while the markets of China, Brazil, India, South Korea, Mexico, Turkey and Russia, in recent years, has grow up quickly, these pharmaceutical markets are known as "pharmerging" emerging markets.

## 2. The Development of Chinese Medicine Industry

### 2.1. The Overall Development Situation

With the development of economy and people's living standard, the pharmaceutical industry in the national status has gradually improved, take a look at can the Table 4, the proportion of the pharmaceutical industry output value in GDP has also risen, from 2.67% in 2008 to 3.61% in 2012, in general, the rise of proportion is large. Due to the reasons that domestic and international market demand for pharmaceuticals market and consumption will continue to increase, this will allow the industry to develop rapidly, increasing the position in national economy [3].

Table 4: The proportion of medicine gross industrial output value in GDP in 2008-2012

Year	2008	2009	2010	2011	2012
The proportion in GDP	2.67%	2.92%	3.08%	3.31%	3.61%

Source: China statistical yearbook

In 2013, Chinese pharmaceutical industry's main business income is 2.1682 trillion yuan, increased by 17.9%. In 2013, Chinese pharmaceutical industry profits totaled 219.7 billion yuan, increased by 17.6% than the same period last year, which has kept a high level of growth.

Take a look at Table 5, from 2005 to 2012, the Chinese medicine manufacturing gross value of industrial output and main business income increased with the same pace, gross value of industrial output increased from 425.045 billion yuan to 1.662831 trillion yuan, enterprise unit number increased from 4971 to 6387, the main business revenue growth from 313.919 billion yuan to 1.733767 trillion yuan, increased by almost 6 times. Profit growth from 33.82 billion yuan to 186.589 billion yuan, the average annual growth of 28.39% efficiency improved; the annual average number of all workers also increased from 1.2344 million to 1.9666 million.

Table 5: Chinese medicine manufacturing main business income, total profit, the number of enterprises, the gross value of industrial output, etc

Year	Enterprise number	Industrial production (one hundred million yuan)	Main business income (one hundred million yuan)	Total profit (one hundred million yuan)	The annual average number of all worker (one hundred million yuan)
2005	4971	4250.45	3139.19	338.20	123.44
2006	5368	5018.94	4718.82	372.55	130.28
2007	5748	6361.90	5967.13	581.28	137.34
2008	6524	7874.98	7402.33	792.9	150.75
2009	6087	9443.30	9087	993.96	160.48
2010	7039	11741.31	11417.30	1331.09	173.17
2011	5926	14941.99	14484.38	1606.02	178.60
2012	6387	16628.31	17337.67	1865.89	196.66

Source: China industrial economic statistical yearbook from 2006 to 2013

Take a look at Table 4 and Table 5, in 2012, among Chinese pharmaceutical manufacturing industry, large and medium-sized industrial enterprises (the industrial enterprises that their employees is more than 300 people and main business income is 20 million yuan or more), their unit number accounts for 22.91% of the entire pharmaceutical manufacturing unit number, main business income accounted for 63.66%, total assets accounted for 71.74%, total profits accounted for 70.09%, the industry concentration degree has enhanced unceasingly. At the same time, the number of industrial enterprises with funds from foreign investment, HongKong, Macao and Taiwan accounted for 14.81% of the entire pharmaceutical manufacturing unit, the main business income accounted for 23.39%, total assets accounted for 25.48%, total profits accounted for 25.25%, this demonstrates medicine manufacturing joint ventures accounted for larger proportion in china. Number of state-owned and state holding industrial enterprises accounted for 6.65% of the entire pharmaceutical manufacturing unit, the main business income accounted for 12.83%, total assets accounted for 18.84%, total profits accounted for 12.51%, main business income and total assets and total profits are substantially below the industry average, which shows that state-owned capital in the pharmaceutical manufacturing industry takes a low proportion [4,5].

Table 6: Chinese medicine manufacturing enterprise according to type in 2012

Composition	Enterprise unit number	Pharmaceutical manufacturing proportion	Main business income	Proportion in Pharmaceutical manufacturing	Total assets	Proportion in Pharmaceutical manufacturing	Total profit	Proportion in Pharmaceutical manufacturing
Large and medium-sized industrial enterprises	1463	22.91%	11036.76	63.66%	11312.52	71.74%	1307.73	70.09%
Foreign, HongKong, Macao and Taiwan investment industrial enterprises	946	14.81%	4056.12	23.39%	4017.28	25.48%	471.19	25.25%
State-owned and state holding industrial enterprises	425	6.65%	2224.60	12.83%	2971.07	18.84%	233.35	12.51%

Note: Large and medium-sized industrial enterprises are those that their employees is more than 300 people and main business income is more than 20 million yuan

## 2.2. The Chinese Medicine Industry Development in Each Industry

Among the industrial production of Chinese Pharmaceutical industry in each industry, chemical medicine preparation industry industrial output value is more than \$500 billion in 2012 and becomes the largest category; Proprietary Chinese medicine manufacturing industry ranks second with more than 400 billion yuan, chemical API manufacturing is more than 300 billion yuan in the third. From the compound growth rate from 2008 to 2012, hygiene materials and medical supplies manufacturers, Chinese medicinal slices processing industrial output is relatively small, with relatively high growth rate, by 34.82% and 28.53% respectively in the first and second, proprietary Chinese medicine manufacturing industry with 25.51% compound growth rate in the third place, as Table 7 shows.

Among the main business income of Chinese medicine industry in each industry, chemical medicine preparations industry ranks first with main business income of 502.4 billion yuan in 2012; Proprietary Chinese medicine manufacturing industry with more than 400 billion yuan of main business income ranks second, chemical pharmaceuticals manufacturing with main business income of more than 300 billion yuan in the third. From the compound growth rate from 2008 to 2012, the main business income of hygiene materials, medical supplies manufacturers, and Chinese medicinal slices processing main business is relatively small, ranks first and second with the compound growth rate of respectively 30.06% and 28.55%, proprietary Chinese medicine manufacturing industry with the compound growth rate of 27.03% in the third, it shows a better growth, just as Table 8 demonstrates.

Table 7: The industrial production of Chinese pharmaceutical industry in each industry in 2008-2012. (Hundred million yuan)

Industry	2008	2009	2010	2011	2012	Compound Annual growth rate
Chemical medicine Preparation industry	2406	2877	3473	4262	5217	21.35%
Proprietary Chinese medicine manufacturing	1705	2054	2614	3522	4231	25.51%
Chemical raw materials manufacturing	1782	1969	2432	2952	3421	17.71%
Manufacturing of biological and biochemical products	870	1084	1346	1782	1909	21.71%
Medical equipment and instrument manufacturing	829	967	1174	1359	1606	17.96%
Hygiene materials and medical supplies manufacturing	409	526	641	955	1352	34.82%
Chinese medicine yinbian processing industry	379	469	668	792	1034	28.53%
Pharmaceutical manufacturing industry in general	8381	9946	12349	15624	18770	22.33%

Note: data from the national bureau of statistics, China statistics yearbook on high technology industry (the order is based on the industrial output of chemical technical, chemical medicine preparations, biological and biochemical products, medical apparatus and instruments, hygiene materials and medical supplies, proprietary Chinese medicine and Chinese medicinal slices seven architectural industry in 2012.

Table 8: The main business income of Chinese medicine industry in each industry in 2008-2012. (Hundred million yuan)

Industry	2008	2009	2010	2011	2012	Compound Annual growth rate
Chemical medicine Preparation industry	2250	2770	3428	4141	5024	22.24%
Proprietary Chinese medicine manufacturing	1567	1936	2476	3319	4079	27.03%
Chemical raw materials manufacturing	1707	1956	2438	2934	3290	17.82%
Manufacturing of biological and biochemical products	795	1024	1261	1682	1775	22.25%
Medical equipment and instrument manufacturing	790	932	1141	1337	1565	18.64%
Hygiene materials and medical supplies manufacturing	392	510	623	943	1122	30.06%
Chinese medicine yinbian processing industry	363	441	634	771	990	28.55%
Pharmaceutical manufacturing industry in general	7863	9568	11999	15126	17845	22.74%

Note: data from the national bureau of statistics, China statistics yearbook on high technology industry (; the order is based on the main business income of chemical technical, chemical medicine preparations, biological and biochemical products, medical apparatus and instruments, hygiene materials and medical supplies, proprietary Chinese medicine and Chinese medicinal slices seven architectural industry in 2012.

Among the profit margins of Chinese medicine industry in each industry in 2008-2012, biological and biochemical products manufacturing, proprietary Chinese medicine manufacturing, medical equipment and instruments manufacturing as well as chemical drug preparations of chemical medicine preparation industry all accounts for more than 10%; biological, biochemical products annual manufacturing accun by ranks first with the profit margin of close to 13% , proprietary Chinese medicine manufacturing industry ranks second with 11% profit margin, such as Table 9 shows.

Table 9: The profit margins of Chinese medicine industry in each in industry

Industry	2008	2009	2010	2011	2012
Manufacturing of biological and biochemical products	12.48%	13.71%	14.83%	13.75%	12.96%
Chemical medicine Preparation industry	12.10%	11.85%	12.37%	14.83%	13.75%
Medical equipment and instrument manufacturing	10.29%	12.00%	10.98%	11.46%	10.81%
Proprietary Chinese medicine manufacturing	11.34%	11.46%	12.52%	11.61%	10.70%
Hygiene materials and medical supplies manufacturing	8.51%	9.14%	9.99%	10.14%	10.22%
Chemical raw materials manufacturing	8.79%	8.90%	9.69%	8.70%	7.39%
Chinese medicine yinpian processing industry	7.38%	7.33%	8.77%	9.01%	7.17%
Pharmaceutical manufacturing industry in general	10.69%	11.03%	11.67%	10.93%	10.20%

Note: data from the national bureau of statistics, China statistics yearbook on high technology industry ; the order is based on the profit margins of chemical technical, chemical medicine preparations, biological and biochemical products, medical apparatus and instruments, hygiene materials and medical supplies, proprietary Chinese medicine and Chinese medicinal slices seven architectural industry in 2012.

### 2.3. Chinese Medicine Industry Development Trend in the Future

At present, the proportion of R&D investment in the main business income is average 1% - 2% in the pharmaceutical industry, and average level in foreign countries is 15% - 18%, the level in India, which adjacent to us, also as a developing country, is 6% to 12%. The proportion of R&D investment in Chinese main business income is less than 2% on average, only a handful of companies such as Yangtze river pharmaceutical group co., LTD., step length pharmaceutical group co., LTD., Shandong green pharmaceutical co., LTD is more than 5%. Chinese overall R&D spending is less than 40 % of R&D input of foreign R&D type pharmaceutical enterprise a year. As for these R&D investment-leading pharmaceutical companies in china , only two or three of these companies' R&D spending accounts for more than 10% of main business income , after all, the



level of China's pharmaceutical industry innovation ability on the whole is relatively low, it is a long and difficult process to run after the developed countries.

Compared with advanced foreign multinational pharmaceutical companies, Chinese pharmaceutical enterprise R&D input is limited, we should carry out drug innovation research according to their own strength. From the present stage, it takes much effort to achieve breakthrough innovation (new drug molecules innovation), in contrast, the modification of innovation and imitation innovation is relatively easy to do, that is "Me too" drugs, this innovation model is a purposeful, less-invested, short-cycled, high success rate, and there is a high imitation in innovation, as well as innovation in imitation, imitation and innovation can combine together, which effectively saves the R&D input. Therefore, at present, the Me-too drugs is the best choice for Chinese innovation [6].

Chinese pharmaceutical enterprises should assess the situation, make full use of the development and change of the disease, keep up with the overall research and development trend in pharmaceutical innovation as soon as possible, especially to find a solution to the research and development of new breakthrough in using the rich resources of traditional Chinese medicine.

### **3. The Existing Problems in the Development of Pharmaceutical Industry in China**

Chinese biological medicine industry has formed relatively apparent industry characteristics and competitive advantage, but there is still a huge gap to become a real strategic emerging industry. Research shows that Chinese pharmaceutical industry mainly has the following six major problems.

#### **3.1. Narrow Industry Financing Channel and a Serious Shortage of Funding**

Basic research is under-funded and industrialization is lack of funds. Biotechnology companies originally come from small businesses, there exist the follow-up funding problems in development, the whole system of high-tech development lacks risk investment in our country, so does support, and the biotechnology industry and industry communication channel is not smooth, so, there is a serious shortage of China biological medicine research funding.

#### **3.2. Technical Property Rights Trading Market is not Sound, it is Difficult to form a Pattern of Social Development**

When discussing the biotechnology industry development, many people have noticed the internationalization problem that we faced, but only little attention has been paid on the problem of socialization. Because of the lack of social consciousness and the atmosphere, as well as other all sorts of reasons, some of China's emerging biotechnology companies, many go from research and development to production and sales all the way, which makes them very hard. In fact, from the research to the product sales, there are many links that can be socialized in the middle. Owing that Chinese technology property right trade market is not developed, many biological technology projects are difficult to transfer in the intermediate links, so we can't give full use to the role of the division of social functions, which makes the biological pharmaceutical industry project hard in development, even die young.

### **3.3 The Technical Project Lacks the Industrialization of Market Mechanism**

Foreign experience shows that high-tech can accelerate its process of industrialization by capital markets business. And there are few domestic companies to participate in biotechnology research and achievement transformation, which has greatly influenced the research and development of biological technology. Chinese biomedical laboratory research and industrial development are disjointed, only after fulfilling the scientific research, the researchers will publish the results, it means they have finished the task, and in order to avoid risk, the companies are unwilling to intervene the project of biotechnology too early. Which makes even after completion of study in laboratory, it is difficult for the scientists to find entrepreneurs and aimless for entrepreneurs to look for projects.

### **3.4. The Backward Enterprise's Management Level**

Enterprise software has two main aspects, one is the various management standard, the second is the quality of personnel, both of them is important. Biopharmaceutical as a high technology industry, not only requires advanced hardware equipments, but also the advanced software requirements .Chinese current situation is that most advanced equipment is imported from abroad, but the rules and regulations that staff and personnel formulate is native, the direct result that the two is unmatched is the low product quality stability, which wastes the hardware resources.

### **3.5. Project Redundant Construction and Vicious Competition**

At present, most of the domestic genetic engineering drugs is generic, it takes 5 to 8 years to develop a new drug abroad, the average cost is \$300 million, but it only costs several million yuan for China to copy a new drug with about five years; Plus the high added value of biotech drugs, many enterprises (including pharmaceutical companies) have carried out biomedical projects, causing the phenomenon of the redundant construction. Such as interferon, more than 20 manufacturing enterprises are blind to repeat production, which lead to a vicious competition.

### **3.6. The Enterprise Product Market Positioning is Confined to the Domestic Market**

Chinese biological medicine enterprise product market positioning is essentially the domestic market, although Chinese population is large, the effective demand for medical market is low. Chinese biomedical technology research development and production is not in line with international standards, product is unable to enter the market of developed countries, even though there is a access to a class of new durgs, the national sales is only several hundred million yuan, however, one variety sales of European and American manufacturers can reach hundreds of millions of dollars, or even billions of dollars. Thus, it is difficult for Chinese biological pharmaceutical enterprise to obtain economies of scale.

## **4. The Countermeasures of Chinese Biomedical Industry Development**

### **4.1. Adhere to the Scientific Development as Guide, Promote Biological Medicine Industry Rapid Development**

Adhere to the scientific development concept as the instruction and meet the demand of the people's growing health as the fundamental starting point and the foothold, tightly grip the important opportunity to rapidly develop biological medicine industry, give full play to these three aspects, these are government guide the coordination, market regulation and the enterprise to organize the implementation, in order to form "big business", to construct "big park", cultivate "big business", support "big project", "extend industrial chain" for the gripper, start from strengthening technical innovation ability, strengthening the original innovation and integrated innovation, focus on developing in modern pharmaceutical industry and medical equipment industry, vigorously promote chemical pharmaceuticals, make the breakthroughs in biotechnology pharmaceuticals, take efforts to achieve higher and better industry layout, bigger enterprises scale as well as stronger competition strength, so it is our aim to promote biological medicine industry to become the emerging industry that demonstrate speedy growth, strong running quality and strategic leading role, thus to form a new pattern of Chinese biological medicine industry development.

#### **4.2. The Market Operates, the Government Guides**

Adhere to the strategy of "introducing", promote cooperation and opening up, actively undertake industrial transfer, attract the foreign large enterprise groups to invest in China, promote industrial scale and economic aggregate. Focus on cultivating base as the carrier, regard leading enterprises as the core, regard the backbone enterprises and key products as the breakthrough point, small and medium-sized enterprises cluster together to promote all kinds of production elements gather together, form a competitive industrial clusters and achieve rapid expansion of industrial scale. Adhere to the "going out" strategy, encourage innovation institutions and large domestic enterprises go abroad, to actively participate in the international and domestic cooperation, improve the internationalization and modernization level of Chinese biological medicine industry

#### **4.3. Innovation Leads, Make Breakthrough in Key Points**

Regard independent innovation as the base point of the industry development and guidelines, take enterprises as the main body, combine the industry, education and research together, focus on Chinese characteristics and advantages, select a batch of major projects, through the key technology and the industrialization of major products, promote the competitiveness of the traditional advantage industry. Track technology development trend, adhere to combine the independent innovation with digestion and innovation, combine the self development with leveraging development, actively absorb and draw lessons from the domestic and foreign advanced technology and advanced management experience, through the investment attraction and talents introduction, expand exchanges and cooperation, speed up the digestion, absorption and innovation, cultivate new growth points.

#### **4.4. Optimize the Structure, Use Reasonable and Sustainable Development**

Surrounding the construction goal of green rise, in the process of accelerating the development of biological medicine industry, we should adhere to the people-centered, scientific development, properly solve the problem of energy consumption of resources and ecological environment

protection, etc, regard the concept that not only gold and silver is what we want, but also beautiful scenery as our ultimate goal. We must work hard in the optimization of industrial structure and growth mode, seek practical results, improve the level of "four rate", strive for to get development speed, economic benefits, energy resources saving and environment protection in harmony with each other, take the construction of circular economy and the building of a resource-conserving and environmentally friendly industry development goals as the basic direction and the basic task.

China is rich in biological resources, that is an advantage in the biological technology research and industrial development. But look from the current situation, Chinese large creature does not get effective protection and good utilization, some important resources erosion is even serious. Therefore, it is recommended that Chinese relevant departments should attach great importance to the protection and utilization of biological resources. China should develop, improve and enact regulations and rules on the management of all kinds of biological resources as soon as possible, establish and improve the national preservation of biological resources and service system, including the cell bank, the culture collection, poison kinds of libraries, PBR, database, etc.

#### **4.5. Strengthen the Cooperation of Enterprises and Research Institutes**

Biological medicine enterprise's core competitiveness lies in the development of technology, and at present Chinese biotechnology research strength is mainly focused on scientific research institutes, the enterprise research and development strength is weak. Researchers just start from the study, not from the demand of the market, which makes a big difference in goals of the researchers and the goals of the enterprise. So we must strengthen the cooperation of enterprises and scientific research institutes, combine the goal of the enterprise with scientific research, what is more, we should give full play to the advantages of Chinese low human capital, which makes the biological pharmaceutical enterprise is competitive in the world.

#### **4.6. Make Full Use of Capital Market in Our Country, Realize the Combination of Technology and Capital**

We can solve the financing problems of these major technical projects that have independent intellectual property and uniqueness by the way of concept listing, speed up the commercialization, industrialization of biotechnology. Strive to develop major biological products with independent intellectual property rights and the international competitiveness in 5 to 10 years, at the same time, pioneer a successful road of biological technology achievements transformation. Securities companies can do well in this regard, they can use their own key scientific research project, timely to serve themselves to move toward capital market. The Chinese government should support conditional priority high-tech enterprises to enter the domestic and international capital markets.

#### **4.7. Strength Technical Support Policy**

To improve the quality of high-valued drug technical support. Candidate plateau pharmaceutical products have expected annual output value will more than 1 billion yuan, the difference between the expected output stability with the annual output value is more than 500 million yuan when giving a percentage of the product technical support. In accord with the premise of urban planning

and land use planning, the new production enterprise which are aimed to promote industrial level requires intensive use of land resources, increase the rate of volume, increase the income of land for building area and increase land-transferring fees, once approved, local government can offer certain subsidy. Offer the R&D subsidy to the biological pharmaceutical enterprises that are in the process of new drug development, after getting the document of drug clinical research, the new development of science and technology fund will offer certain subsidy. After getting new drug certificate, offer certain clinical research at its discretion subsidies. In the application of new drugs, test fee offer certain subsidy. The bank will offer loans to the new production enterprises that implement key projects (products), once approved, offer discount in accordance with the 80% of the highest benchmark lending rate, and the period normally do not exceed a year.

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