

Development Environment and SWOT Analysis of Biomedical SMEs after COVID-19: Evidence from China

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Abstract. After the outbreak of the COVID-19, biomedical companies are facing good development opportunities. However, under the background of the country's strong support for the development of the biomedical industry, small and medium-sized enterprises (SMEs) in biomedical industry will face new competitive challenges. Therefore, in this research, the industrial development analysis, Porter's five forces analysis model and SWOT analysis model were applied in exploring the development environment and industrial competitiveness of biomedical SMEs. From the results and discussions of this study, it is not difficult to find that China is experiencing a social change of decreasing birth population and aging population, and the biomedical industry needs to make timely strategies accordingly. Meanwhile, due to the increasing per capita medical and health expenditure, it is a rare opportunity for the biomedical companies to promote the prosperity and development of this industry. This study also analyzes the current development problems faced by the biomedical SMEs in China, which provides useful reference for relevant enterprises and policy makers.

Keywords: Biomedical industry; development environment; SWOT analysis.

1. Introduction

The outbreak of the COVID-19 in early 2020 had a great impact on different industries worldwide. As for companies in biomedical industry, great development opportunities exist as well as the intense competitive challenges, especially for SMEs [1]. SMEs play a pivotal role in global economic development, and they account for more than half of the market share. There are many small and medium-sized enterprises in China, many of which have occupied more than 60% of China's industrial market within ten years of establishment. SMEs are also responsible for providing employment opportunities. Considering the continuous increase of China's per capita income, the national medical and health expenditure has increased year by year. Biomedical enterprises are facing unprecedented development opportunities. Therefore, how to promote the development of the biomedical industry to meet people's medical and health needs in the post pandemic era is worthy of in-depth study. In this research, the development environment for China's biomedical SMEs is analyzed by various strategic analysis frameworks and the development path for China's biomedical SMEs is also suggested.

2. Literature Review and Analysis of Development Environment

The infectious disease of COVID-19 became a global outbreak since 2019. To stop the spread of the virus in a short time, countries around the world have invested a lot of money, and speed up the approval process for drugs. Each government or agency will individually encourage companies to work on relevant vaccines [2]. In terms of the proportion of a country's medical and health expenditure in its GDP, the world's average medical and health expenditure in its GDP level fluctuated, but on the whole, it was stable but rising, from 8.57% in 2000 to 10.02% in 2016, an increase of 1.45%. From the perspective of major countries and regions in the world, the structural expenditure of the biomedical industry in the United States is not only much higher than the world average level, but also much higher than the majority of countries in the world in terms of structural

growth [3]. Biomedical industry in the United States is quite developed and occupies a very important position in its industrial structure, while this industry in China is still in a growing period and shows great market potential. The pandemic situation has brought a significant impact on the global biomedical industry, and drug companies have also been adapted and readjusted quickly, such as developing vaccines, therapeutics and diagnostic equipment [4]. Look at the impact of a long-term trend, biomedical companies will grow rapidly worldwide, and supply chains for equipment and medication will also be strengthened to cope with huge demand.

2.1 Political Environment

After the outbreak of the COVID-19 in 2020, the National Food and Drug Administration specially issued the “Notice on Printing and Distributing Emergency Approval Procedures for Medical Devices”. To meet the financing needs of biomedical companies while reducing their financing costs, the state has introduced targeted financing support policies for biomedical companies. Chinese government has also introduced a series of preferential tax policies such as the full refund of incremental value-added tax credits for key biomedical material manufacturers, and the exemption of registration fees for related anti-epidemic drugs and medical devices. To help the development of biomedical SMEs after the outbreak of pandemic, the state reduced the value-added tax rate for small-scale taxpayers from 3% to 1%, reducing the tax burden for biomedical SMEs.

2.2 Economic Environment

Gross domestic product (GDP) keeps growing year after year. Although in 2020, due to the COVID-19, the global economy will be substantially depressed, China adopted various macro-control measures to stimulate consumption and increase investment. 2020 is the final year for China to build a moderately prosperous society in an all-round way and fight against poverty. The total economic volume reached a new level of 100 trillion yuan for the first time as shown in Figure 1.

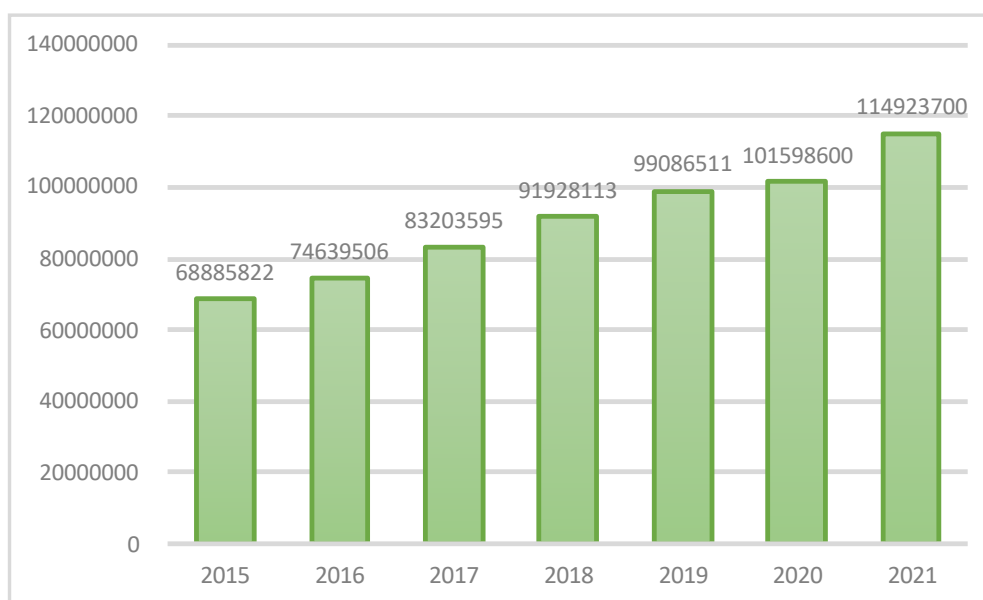


Fig. 1 China's GDP from 2015 to 2021 (in million CNY)

China's biomedical industry is in a state of vigorous development, and the total production of biomedicine is increasing year by year. According to statistics, since 2014, China's biomedical industry has entered a period of rapid development, and the total output value of the national biomedical industry has jumped from 116.7 billion yuan in 2014 to 387 billion yuan in 2020, achieving a 330% increase in 7 years as shown in Figure 2.

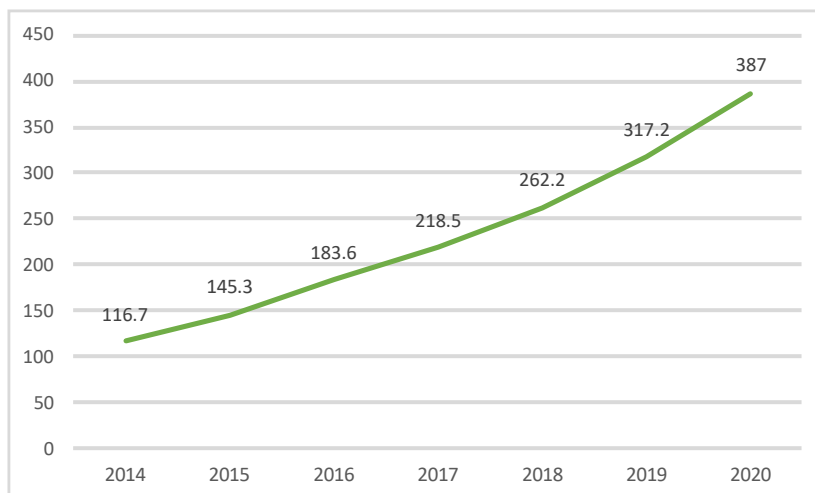


Fig. 2 The scale of China's biomedical market from 2014 to 2020(in trillion CNY)

2.3 Social Environment

Since 2016, the elderly population over 60 years old in China has been increasing, while the birth rate has shown a sharp decline (see Figure 3 for details), indicating that the aging trend of China's population is serious (see Figure 4 for details). The trend of population aging has promoted the development of the biomedical industry to a certain extent, bringing larger markets and more opportunities to the biomedical industry.

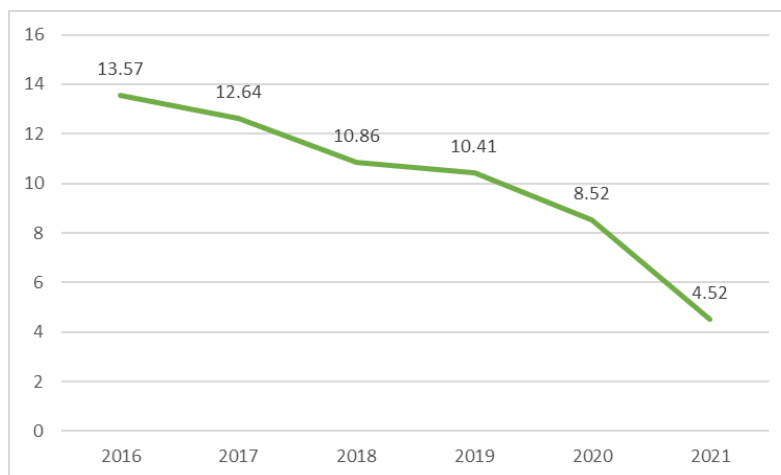


Fig. 3 China's birth rate between 2016 to 2021 (%)

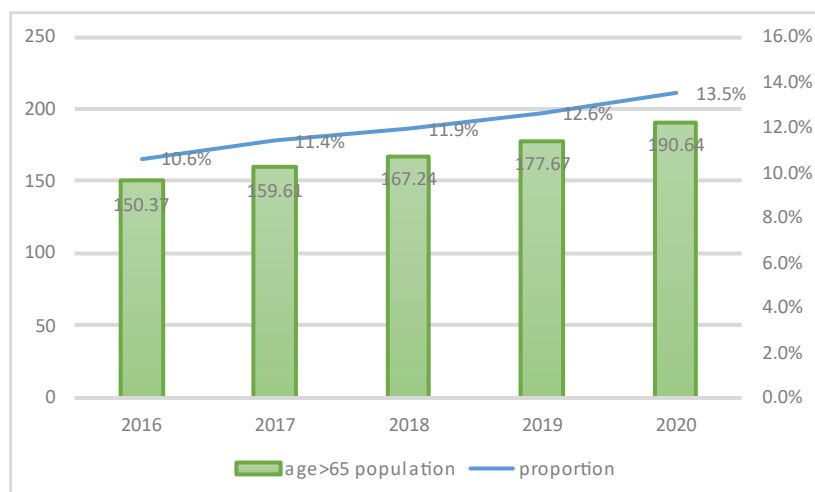


Fig. 4 People older than 65 population (in million) and its proportion between 2016 to 2020

With the development of economic globalization, China's national income continues to rise, and people's demand for disease protection is increasing, which puts forward higher requirements for the development of the pharmaceutical industry. In addition, the change of consumption concept has also made new pharmaceutical products sell well, which has improved the innovation motivation of Chinese biomedical enterprises. According to relevant statistics, from 2015 to 2019, China's total medical care expenditure increased from 4,097.46 billion yuan to 6,505.72 billion yuan, with a compound annual growth rate of 12.3%. This rapid growth is expected to continue in the future. It is estimated that China's total healthcare expenditure will reach 786.74 billion yuan by 2021, as shown in Figure 5.

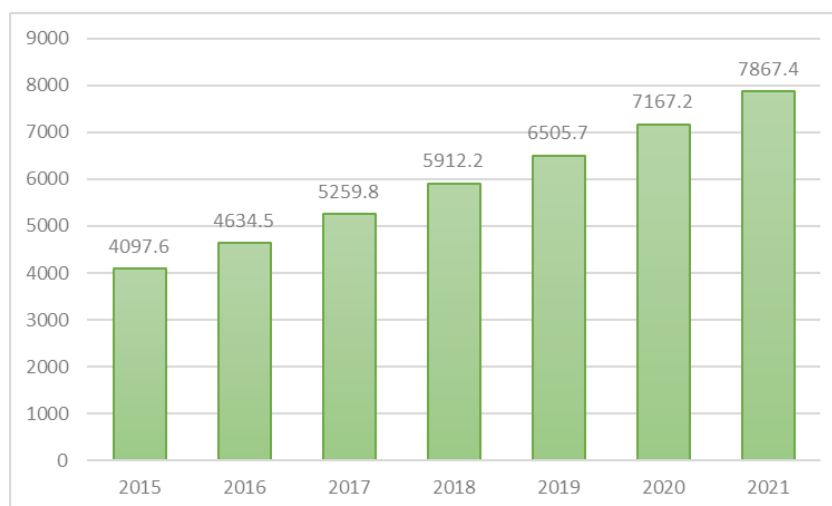


Fig. 5 China's personal medical expenditure between 2015 to 2021 (CNY)

2.4 Technological Environment

At present, China's research funding is insufficient. With the country's gradual emphasis on the biomedical industry, more and more special support funds have been put in place, and the biomedical industry has shown greater market demand, resulting in the birth of more biomedical companies. However, compared with other countries, the R&D investment of Chinese biomedical companies is still relatively small, which makes it difficult for biomedical companies to improve their technological innovation capabilities and obtain a high-quality experimental environment, making it difficult to achieve breakthroughs in scientific research and experiments, which will eventually lead to low-price competition for market share [5]. Figure 6 shows the global, US and Chinese drug R&D expenditures from 2015 to 2020.

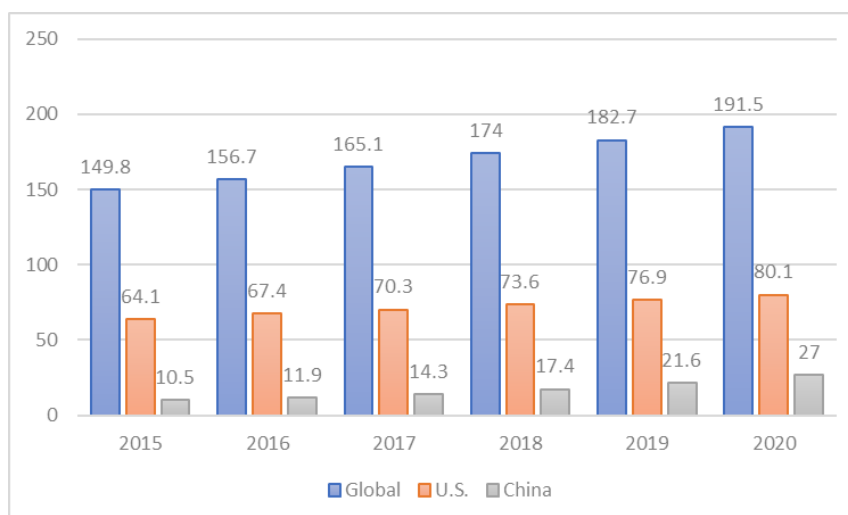


Fig. 6 Biomedical R&D Expenditure between Global, U.S. and China (billion USD)

Through the establishment of the PEST model, the analysis of the macro-environment of biomedical companies shows that the development environment of Chinese biomedical companies is relatively superior in terms of policy, legal environment, economic environment, and social and cultural environment. However, in terms of the technical environment, there is still a large gap between the research funding of Chinese biomedical companies and other developed countries, which directly leads to the weak technological innovation capabilities of Chinese biomedical companies. This is especially true for Chinese biomedical SMEs, because their own scale and resource constraints determine that biomedical SMEs cannot invest a large amount of scientific research funds, resulting in the technological innovation capabilities of Chinese biomedical SMEs is weak and lacks a competitive advantage.

3. SWOT Analysis for China's biomedical SMEs

The SWOT model is an analysis method that draws relevant conclusions by analyzing the impact of internal and external environmental factors faced by a subject. Through this model, the development status of the subject can be analyzed.

3.1 Analysis of Strength

The biggest advantages of biomedical SMEs are flexible operating mechanism, fast transformation and low cost. Due to their small scale, small and micro biomedical enterprises could operate in a flexible manner, and can respond quickly to changes in market demand and policy adjustments, thereby making corresponding adjustments. In the current situation of overcapacity in China, the transformation and upgrading of products of small and micro biomedical enterprises is also very fast, and the transformation cost is low. Biomedical SMEs have a strong ability to grasp market demand, so they can understand the actual needs of the biomedical market in the first place [6]. Biomedical SMEs can timely adjust their strategic decisions and operating policies according to the current demand changes in the biomedical market, so as to correctly make feasible decisions that suit their own business development. Whenever business opportunities arise in the market, biomedical SMEs can always quickly seize the market, thereby achieving the goal of quick profit. Once the market encounters operational risks, they can quickly withdraw from the market.

3.1.1 The effect of policy

After the outbreak of COVID-19 in 2020, the development of biomedical SMEs has risen to the national level and has received more and more attention from the state. The Chinese government has specially formulated many corresponding support policies and incentives, such as exemption of administrative fees, reduction of value-added tax rates, and implementation of special subsidies for innovative projects. These measures have greatly reduced the burden on small and micro biomedical enterprises, mobilized the enthusiasm of enterprises, and achieved twice the result with half the effort. The vitality of small and micro biomedical enterprises has been enhanced, showing a state of vitality, which has greatly promoted the country's economy and biotechnology.

3.1.2 Development prospect

Small and micro biomedical enterprises are highly dependent on each other, and can survive and develop by relying on large and medium-sized biomedical enterprises. Biomedical SMEs can attach themselves to large and medium-sized biomedical enterprises, spawn many related industries in the process of product production and sales, form alliances with them, and become a link in the industrial chain of large and medium-sized biomedical enterprises. The division of labor, cooperation and close cooperation among the alliances between enterprises can jointly resist the ever-changing market risks and share the fruits of cooperation, so as to achieve mutual benefit and win-win cooperation.

3.2 Analysis of Weakness

3.2.1 Management of SMEs

Biomedical SMEs are small in scale and have few employees. They often lack standardized and professional design and consideration of corporate strategic planning, lack a complete set of management systems, and have unclear responsibilities. With the gradual development of the enterprise, the personal energy, ability and will of the enterprise managers are constantly challenged. In addition, most small and micro biomedical companies lack professional evaluation teams for decision-making on some important issues such as technology selection, and generally only rely on their own experience to make judgments, they are often in a state of "crossing the river by feeling the stones". So, it is very easy to make short-sighted decisions. Relevant survey shows that the systems and regulations of many biomedical SMEs lack the formal regulations, lack systematic job responsibilities and corresponding incentive mechanisms. The nepotism, sentimentalism, and chaotic management are usually exit in the management of SMEs [7].

3.2.2 Financing for SMEs

Difficulty in financing is one of the important reasons hindering the development of small and micro biomedical enterprises. Because the economic base determines the superstructure, and capital is the blood of an enterprise, which plays a vital role in the growth of an enterprise. The capital market is profit-oriented. Due to the uncertainty in the development of biomedical SMEs and the lack of effective collateral, formal financial institutions are always hesitant when facing the financing needs of biomedical small and micro enterprises.

3.2.3 Product pricing power

Biomedical small and micro enterprises are always in a weak position in the competition for market share. Small and micro biopharmaceutical enterprises in a weak state lack the pricing power of products. For the survival of enterprises, many enterprises can only accept some relatively harsh competition conditions. With the development of the biomedical industry, large and medium-sized biomedical companies rely on their resource advantages to control the pricing power of most products in the biopharmaceutical market, thereby obtaining huge profits. However, the situation of small and micro biopharmaceutical enterprises is the opposite. In most cases, they can only passively accept the market price that has been set, and even actively adjust the market price to a direction that is not conducive to themselves in order to survive, such as accepting rising raw material prices, or sell the product at a reduced price.

3.2.4 Difficulties in branding

Survival is the top priority of biomedical small and micro enterprises. Under the current economic environment in China, biomedical small and micro enterprises will first consider immediate interests when they have no accumulation and poor foundation. Driven by the supremacy of profits, most small and micro biomedical enterprises in China gradually give up their own product innovation due to excessive price competition, and call infringement and plagiarism "high imitation". A large number of SMEs' development depends on generic drugs, and they lack its own core technology.

3.3 Analysis of Opportunities

3.3.1 The overall medical market

After the outbreak of COVID-9 in 2020, the development of China's biopharmaceutical industry has risen to the national level. China's biomedical technology innovation has received more and more attention from the state, and the government has formulated many corresponding support policies and incentives for it. Under such a favorable development environment, China's biomedical industry has withstood tremendous pressure and has continuously made scientific breakthroughs in the research of new crown vaccines. The rapid development of biomedical technology has promoted the

development of China's biomedical industry and provided strong support for improving public satisfaction and improving people's livelihood [8].

3.3.2 Improvement of the medical system

The continuous improvement of the medical security system has put forward higher requirements for the development of my country's biomedical industry. In the context of the continuous improvement of China's social security system, the scope of medical insurance coverage is increasing, and higher requirements are placed on the development of Chinese biopharmaceutical companies. This is mainly reflected in the following two aspects: (1) In the background of continuous improvement of people's living standards, people's health awareness continues to increase, and higher requirements are putting forward for the efficacy and health of drugs; (2) People's consumption concepts has changed, innovative technologies in the biomedical industry are increasingly appearing in the field of improving people's material life, such as the continuous rise of industries such as medical care and medical beauty.

3.4 Analysis of Threats

3.4.1 Intellectual property

Intellectual property disputes have a negative impact on biomedical small and micro enterprises. The biomedical industry has high requirements for knowledge and technology [9]. The establishment of many biomedical small and micro enterprises may only rely on one or a few intellectual property rights. For such enterprises, the protection of intellectual property rights is the basis for their stable development. However, in the actual operation process, the infringement of intellectual property rights of small and micro biomedical enterprises is very common, but because China's policies and regulations on intellectual property protection are not perfect, once an intellectual property dispute arises, it will last for a long time. This will greatly restrict the energy invested by biomedical companies in production technology.

3.4.2 Vicious competition among enterprises

The situation of vicious competition among enterprises makes the small and micro biomedical enterprises face difficult development prospects. At present, China's biopharmaceutical industry presents huge potential and huge room for development. However, the lack of industry constraints has caused the development of the biomedical industry to present a relatively chaotic situation, and even vicious competition. Therefore, in order to achieve better development, the biomedical industry must enter a benign development trend, and hierarchy and gradient are the main development directions [10]. At present, China's biopharmaceutical market is mainly dominated by large and medium-sized enterprises, and the influence of small and micro enterprises is very limited. Vicious competition makes it more difficult for small and micro enterprises to survive in the market.

In summary, in addition to opportunities, China's biomedical small and micro enterprises still need to face many challenges, such as intellectual property disputes, vicious competition among enterprises, etc.

4. Conclusion and Strategic Choice

By analyzing the internal and external environment of biomedical SMEs and the fierce market competition environment, this paper concluded that in order to seek better development, biomedical small and micro enterprises need to adopt the strategy, and enhance their core competitiveness by strengthening technological innovation, to implement the horizontal alliance strategy. Through the horizontal alliance, the resource and technology complementarity among small and micro biomedical enterprises will be formed, so as to achieve sustainable development.

Based on the above analysis of biomedical small and micro enterprises, this study summarizes the SWOT analysis and puts forward the development strategy of biomedical small and micro enterprises. Strategies are mainly divided into four categories: SO strategy, WO strategy, ST strategy, and WT

strategy. Among them, the SO strategy focuses on making full use of its own advantages, grasping the development opportunities of the industry, and implementing the horizontal alliance strategy. The WO strategy focuses on the development of core products and the upgrading of core technologies. The ST strategy focuses on enhancing the core competitiveness of enterprises, strives to adapt to policy changes, and implements the horizontal alliance strategy step by step. WT strategy focuses on perfecting the internal management system of the enterprise and vigorously developing the existing business.

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