Research on the Development Trend and Prospect of the Pharmaceutical Industry under the Impact of COVID-19

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Abstract. The pharmaceutical industry has the function of ensuring people's livelihood and high technical barriers, provides drugs and medical devices, and accompany the people throughout the life process. The pharmaceutical industry, a high-tech sector, plays a significant role in reacting to public health emergencies and avoiding big unexpected diseases in addition to enhancing people's health levels. At the end of 2019, the sudden outbreak of COVID-19 occurred, and its influence continued to expand. It brought new opportunities and challenges to the global pharmaceutical industry. Since the COVID-19, the expanding demand has driven the steady growth of the pharmaceutical industry, powerful nations have led the world pharmaceutical development, new vaccine has become the global highlight. As for pharmaceutical industry to further development, there are several suggestions in this paper: make more basic researches and develop new technologies, pharmaceutical industry alliance seeking win-win cooperation, enhance the independent innovation research and development strength promote industry core competitiveness, follow the national policy guidance to strengthen the pharmaceutical industry financial support.

Keywords: Pharmaceutical industry, development trend, post-epidemic era.

1. Introduction

The pharmaceutical sector is high in technology, high in risk, high in investment, and high in return. In developed countries, it has always been the focal point of competitiveness. International competition is growing increasingly severe as economic globalization progresses. At the beginning of the 21st century, the rapid development of biotechnology and widely used to promote the pharmaceutical industry has entered an unprecedented new stage of development, make it has broad market prospects and huge growth potential of "sunrise industry" more obvious, by many countries and regions in the world race as the key to support the development of strategic industries. According to the data, the global pharmaceutical market size reached $1.3 trillion in 2019.

The pharmaceutical industry in China is growing as well. By 2025, it's anticipated to be worth $1.5 trillion. Yet, on the global pharmaceutical market, the short-term effects of COVID-19 were partially felt. Four of the top five pharmaceutical companies in the world experienced revenue reductions in the first half of 2020, but to different degrees. Since the third quarter of 2020, the global epidemic has been more successfully under control, and pharmaceutical companies have reopened for business. Nonetheless, despite the overall effects of the epidemic, there is still little growth impulse for the pharmaceutical sector. Global pharmaceutical spending in 2020 was $1,218.1 billion, down 1.3 percentage points from the same period in 2019 and up just 0.3% from the previous year, according to official BMI data predictions. World pharmaceutical spending per person was $156.5, down 1.7 percentage points from the same period last year and down 0.8% from year to year.

The paper will discuss about the development trend of pharmaceutical Industry during the COVID-19 period and its recommendations for the future development.

2. Literature Review

Regarding the impact of the COVID-19 on the pharmaceutical industry, Nayyereh et al. (2020) believed that delays in approval, self-sufficiency in production supply chains, slowing industry growth, and potential changes in consumers have become the long-term impact of the pandemic on

the pharmaceutical industry [1]. Ji (2021) pointed out that the benefits of the pharmaceutical industry showed negative growth, and the industry differences were obvious. In the first half of 2020, the sales of the three terminal drugs showed negative growth for the first time, and the types of drugs in the terminal sales also changed [2]. Luan (2023) believed that COVID-19 has led to the increase of national fiscal deficit, economic downturn, increasing gap between enterprises, and pressure on foreign trade and export [3].

For the suggestions of the pharmaceutical industry in the post-epidemic era, Samah et al. (2021) pointed out that the pharmaceutical industry must develop a complete system to discover pathogens, combat epidemics, track disease patterns, be vigilant about future disease transmission, and provide safe and effective treatments to the world [4]. Weng et al. (2023) took Hengrui Pharmaceutical, a leading enterprise of the pharmaceutical manufacturing industry, as an example, indicate that the plight of the pharmaceutical manufacturing industry is not alone, this dilemma is caused by a variety of factors, suggest that pharmaceutical manufacturing enterprises keep light asset operation mode, the enterprise R&D for a certain proportion of cost, increase investment in scientific research, guarantee the combination of research and development investment structure, try to avoid excessive reliance on one in the field of drugs, reduce homogeneity phenomenon [5]. Li et al. (2022) thought enterprises should actively research and develop innovative drugs, give full play to the potential of traditional Chinese medicine, standardize the operation of the pharmaceutical industry, attach importance to the policies supporting the pharmaceutical enterprises, promote the further development of the pharmaceutical industry, and improve China's strength in the world medical field while ensuring the sustainable development of economy and society [6]. Cao and Wei (2022) pointed out that with the continuous stability of the domestic epidemic, the corresponding revenue and profit contribution of the biomedical industry will gradually stabilize in 2022, and the clinical diagnosis and treatment system will be further improved which is based on artificial intelligence. At the same time, the biomedical industry is also faced with problems such as "bottleneck", imperfect innovation ecosystem, new challenges of API export, and shortage of talents. In view of this, CCID Research Institute put forward relevant suggestions on strengthening the R&D, production and application of the weak links of the industrial chain, establishing an interconnected biomedical innovation ecosystem, accelerating the high-end transformation of chemical API, and improving the construction of biomedical talent team [7]. Chen (2022) suggested to further enhance the basic research and development strength, optimize the layout of the bio-pharmaceutical industry, accelerate the cultivation of public service institutions, and attach great importance to talent training [8].

In terms of building models to analyze the valuation changes in the pharmaceutical industry during COVID-19, Carlos and Raquel (2022) indicated that based on the downside and upside risk and the attitudes of different investors, there were performance measurement methods such as the Kappa index and the FT ratio. The results showed that in the global ranking, the highest average and median ETFs were health-related sectors, and the average pharmaceutical portfolio outperformed the real estate portfolio and energy portfolio[9]. Ren et al. (2022) used the ARIMA model modeling, the retrospective forecast of the stock price of the pharmaceutical industry is made. The COVID-19 outbreak has had a big positive impact on China's pharmaceutical industry and will not end in the short term [10].

The previous research above had various perspectives and methods. The paper will analyze the impact of COVID-19 on the pharmaceutical industry, the changes before and after the outbreak of the COVID-19 and put forward relevant suggestions of the pharmaceutical industry in the post-epidemic era.

3. Industry Development and Related Suggestions

On March 11, 2020, the World Health Organization officially announced that the novel coronavirus had entered a global pandemic state, and outbreaks occurred in many countries. With the spread of COVID-19 in the world, all links of the pharmaceutical industry chain have suffered a huge

impact, but at the same time, the pharmaceutical industry around the world is also facing unprecedented opportunities. In recent years, with the gradual acceleration of the process of global economic integration, the pharmaceutical industry among various countries has formed more and more close cooperation in the whole value chain. The rapid development of the pharmaceutical industry has also provided a strong impetus for the economic growth of the host country. However, the coexistence of opportunities and challenges makes there are many unknown variables in the development of the pharmaceutical industry. Coping with various problems including COVID-19 will accelerate the breakthrough innovation and technological competition in the pharmaceutical industry in various countries, thus making a considerable number of pharmaceutical enterprises face greater pressure.

3.1. Industry Changes During COVID-19

3.1.1 Demand

Novel coronavirus is easy to spread, difficult to diagnose and so on, making the biomedical industry ushered in a huge demand. Masks, especially medical N95 masks, play an important role in COVID-19 protection, making medical mask production one of the first medical industries to flourish in early 2020. This was followed by a variety of medical protective equipment, such as goggles, protective clothing and ventilators. After the initial control of the epidemic, how to accurately detect the existence of novel coronavirus has become the second stage demand of the biomedical industry, and the detection reagent of Novel Coronavirus has become the most popular product in the pharmaceutical market. The third stage after protection and testing is that countries all over the world begin to seek the fundamental treatment of novel coronavirus, and the best way is the development of novel coronavirus epidemic prevention vaccine. Situations above are summarized in Table 1.

Russia, the United States and China have invested a lot of money in the research and development of the COVID-19 vaccine. As the COVID-19 vaccines have been released in the global market, the consumption heat brought by them has become another important economic growth point for the biomedical industry. The rapid mutation rate of novel coronavirus and the complex variety of strain mutation, which puts forward higher requirements for the variety and extensive coverage of COVID-19 vaccine, but it is bound to further promote the benefit growth and development of the biomedical industry.

Table 1. Production of key medical supplies in China as of April 30, 2020

Numble	Type	Product	Daily Output (Unit: Million)	Multiple of Growth
1	Protection article	Medical protective gown	0.8	90.6
		Medical non-N95 mask	200	34.1
		Medical N95 mask	5	38.5
2	Disinfection-related product	Wash-free Hand Sanitizer	0.308	2.6
		84 Disinfectant	0.117	1.6
3	Medical Armamentarium	Automatic Infrared Detector	0.0034	23.2
4	Detection Reagent	Disinfection Detection Reagent	7.6	58

Source: Chin*a National Development and Reform Commission.*

3.1.2 National economic strength

Pharmaceutical industry is an industry closely related to science and technology. Whether drugs, biological agents or various medical equipment, all need to rely on biotechnology, chemical technology, pharmaceutical technology, etc. Therefore, the science and technology power is often also a biomedical industry power, but also an economic power. Since the outbreak of COVID-19, the United States, Germany and Japan have achieved a high and fast level of biomedical research and development. As the world's second largest economy in the world, China's core competitiveness of science and technology has been continuously improved in recent years, laying a solid foundation for

the rapid development of the biomedical industry. Therefore, its strength in responding to the epidemic has also impressed the world with new eyes.

3.1.3 New vaccine

The sudden outbreak and impact of COVID-19 have led biomedical companies to attach attention to the research and development of new products. With the expanding new demand for various protective equipment, testing reagents and vaccines and drugs, major biological enterprises and pharmaceutical companies around the world have spared no effort to increase the investment in the research and development of related products, and the research and development of some new products has even risen to the national macro strategic level. With the continuous promotion of national policies and financial funds, the research and development of vaccines and new drugs has become a highlight of the world's biomedical industry.

3.2. Current Situation in the Post-epidemic Era

However, by checking the trend of the pharmaceutical and biological sector, it can be found that the pharmaceutical and biological sector showed a steady upward trend after reaching the lowest point at the beginning of 2019, and had two peaks in the second half of 2020 and 2021[5]. After this, although it fluctuated slightly, it still showed a continuous downward trend on the whole. The reason for this phenomenon is that residents had a relatively high demand for various medical resources in early 2020. The emergence of new diseases caused social panic, and residents were more willing to hoard masks, disinfectant and related drugs than before. Simultaneously, the emergence of new strains has brought another challenge to epidemic prevention. At this time, the pharmaceutical sector had more investors, the pharmaceutical companies continued to rise. Nevertheless, as the epidemic becoming normalization, people's willingness to hoard medical supplies has decreased. Overall, the epidemic has leveled out in most areas, and the impact on residents' daily lives has gradually decreased.

Share price can side reflect the development trend of a certain industry. the share price of pharmaceutical industry is not favored in the post-pandemic era.

3.3. Suggestions for Pharmaceutical Industry in the Post-epidemic Era

3.3.1 More basic researches and core technologies

Establish emergency research on epidemic prevention and control, organize scientific research projects for the clinical treatment of severe pneumonia, virus tracing and epidemiology, vaccine development and production, drug research and development, and so on. In response to the needs of epidemic prevention and control, new technologies and products are supposed to be developed, and rapidly promoted the use and promotion epidemic prevention and control technologies.

3.3.2 Cooperation and mutual benefits

For biological medicine industry, with competition and beat rivals as the core concept of development mode has been inappropriate, each biological enterprise or pharmaceutical enterprises should consider how to form industry alliance, maximize the biological medicine enterprise individual force, in the win-win cooperation development concept of new development itself. The outbreak of COVID-19 also shows that new demand in the biomedical industry will continue to emerge, and the development prospects of the industry will be better and better. Biomedical enterprises do not necessarily have to beat their rivals to develop themselves. They can completely carry out extensive cooperation in the upstream and downstream of the industrial chain and between the industry, and gain their due benefits in the huge biomedical market. Compared with the short-sighted behavior of competition to enhance interests, win-win cooperation is the way to the long-term development of the biomedical industry.

3.3.3 Asset-light operation

Companies need to maintain sufficient current assets to ensure that they are properly invested in research and development. Strong scientific research ability can make enterprises stand out in the industry. At present, the pharmaceutical manufacturing industry generally says that the proportion of innovative drugs in the total revenue is relatively low. The most fundamental problem for pharmaceutical companies is to improve their own scientific research level, to ensure the conversion rate of scientific research results, and to break the shackles of generic drugs. In daily operation, pharmaceutical manufacturing related enterprises should have a more acute awareness of the market and avoid the clustering of scientific research projects. In the combination of R&D investment structure, try to avoid excessive reliance on drugs in the field of drugs. At the same time, ensure that multidisciplinary research parallel, reduce homogeneity phenomenon, and can fall in a field drug competition too mark, get certain supplement in other areas, not excessive influence the company's financial performance [5].

4. Conclusion

The raging COVID-19 has killed tons of millions of people. Medical workers and scientific researchers have been working to improve clinical treatments, improve cure rates and reduce mortality rates. The outbreak is a huge test for global politics, economy, science and humanities.

Through the above discussion, it can be concluded that the pharmaceutical industry has a very broad future prospect. As former British Prime Minister Churchill suggested that people should not waste a crisis, and crisis often means an opportunity to stand out. With the continuous progress of science and technology, the pharmaceutical industry will also usher in more technological innovation. For example, artificial intelligence, big data, gene editing and other technologies will greatly improve the level of medical treatment and the research and development efficiency of pharmaceutical products. The industrial upgrading of the pharmaceutical industry is also one of the future trends. With the constant change of medical mode, pharmaceutical enterprises also need to continuously upgrade their industrial chain according to these changes to meet the demand of the market. With the intensified competition in the global pharmaceutical market, pharmaceutical enterprises also need to continue to expand their overseas markets to increase their competitiveness.

In general, the pharmaceutical industry is a very large market, and it will continue to maintain the trend of rapid growth in the future. Pharmaceutical enterprises need to constantly innovate to adapt to the needs of the market, but also need to constantly improve their own industrial chain level, in order to gain more advantages in the fierce market competition.

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