Literature Review of International Competitiveness of Biological Products Industry

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Abstract: As a transformation carrier of life technology and an important sub-industry of the biological products industry, biological products integrate knowledge in different fields such as biology, chemistry, biochemistry, pharmacy and medicine, and use biological technology to make biological materials such as vaccines, blood, etc. Pharmaceuticals, it can be said that the new development of the biological products industry represented by biological products will greatly change the process of human and social development. To some extent, the international competitiveness of biological products is used to judge a country's international influence Not an exaggeration. Focusing on the theme of the competitiveness of the biological products industry, this article sorts out and researches relevant domestic and foreign literature. So as to lay a solid foundation for the follow-up research on the competitiveness of the biological products industry.

1. Introduction

Modern biotechnology was formed and developed after the 1980s, and gradually formed a bioproduct industry in the following decades, and due to the continuous advancement of biotechnology, the bioproduct industry is still in change. Although academic circles at home and abroad have done research on its competitiveness, judging from the existing literature, either the controversy is relatively large, or the research results are separated for a long time, and the reference significance has been greatly reduced. In addition, due to the particularity of the biological products industry, it is also a great challenge to find comprehensive literature and data. However, from another level, this also makes it possible to start new literature collation and research. It is of greater significance.

2. Related Foreign Literature

At present, the research of foreign biological products is mainly concentrated in the microscopic fields such as the research and development technology of biological products and the property rights of biological products. Two scholars, Zvi Griliches and I. Cockborn, analyzed the impact of price index on biological products; Jorg C. Mahlich and Tonmads Roediger Schluga studied the growth trend of world pharmaceutical R&D investment in the 1990s and followed this A trend that further pointed out the bottleneck problem in the development of biological products. They regarded R&D as a new kind of labor; Scholars such as Mooney and K.George argued in their articles that the output of university researchers and the research of biological products The demand for personnel has not formed a certain proportion, and the company itself has undertaken too much research pressure. Therefore, companies and universities should organically integrate and conduct research and development together; Daron Acemoglu and Joshua Linn study the impact of market size on biological products. And discussed the application of corporate innovation theory in biological products companies; Sindey Gray and Kenth Skogsrik conducted in-depth research on the Swiss and British biological products industry through income models; Vankeirsbilck and other scholars analyzed Raman spectroscopy, and its The application of the biological products industry believes that the development of Raman spectroscopy can well promote the progress of the pharmaceutical manufacturing industry; Vervaet and Chris have thoroughly studied the influence of the new formulation method on the biological products industry, and proposed a system based on

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this. The granulation method should be widely used in the production of biological products; Abraham and John mentioned that the biological products industry provides medicines for humans, so government policies should pay attention to this. Government policies directly affect the development of the biological products industry, and the coordination between the two is worth considering.

Prabodh Malhotra (2010) research shows that the development of Indian biological products has played an important role in improving the availability and affordability. Compared with developed countries, India's manufacturing costs are greatly reduced, so Indian companies can reduce the price of biological products and increase the supply of biological products in India and other low- and middle-income countries. Many policies introduced in 1970 led to this growth, making India's biological products industry almost non-existent and developing into the world's largest imitation producer.

Subramanian R, Toney J H, and Jayachandran C (2011) believe that the global biologics industry is facing the problem of diminishing returns due to large investments in research and development. The main purpose of writing this article is to study the existing research and development practices in the biological products industry, and to provide a strong reference for turning to open innovation. At the same time, research has further identified potential obstacles to the adoption of open innovation and methods to overcome obstacles. This article draws relevant conclusions through the established model and the use of R&D and sales data.

Horner Rory (2013) studied the development of India's bioproducts industry and believes that in the past 30 years, the global development policy environment has undergone fundamental changes. The world emphasizes market-led and export-oriented development at the cost of country-led import substitution. Subsequently, the consensus was further strengthened, which promoted the development of relevant institutions supported by the market. Others think that this ever-changing objective environment will lead to a "step by step reduction in policy space" for development.

The research on industrial competitiveness has been in Western developed countries for a relatively long time, and a large number of theoretical and empirical research results have been formed. We can go back to the mid 1870s, when the famous classical economist Adam Smith creatively put forward a very famous theory-"absolute advantage theory". In the absolute advantage theory, he proposed The division of labor is the important source that stimulates the improvement of production efficiency and the countries that compete in the international market to gain absolute advantage in international trade. About 100 years later, in the early 1870s, the economist David Ricardo used Adam Smith's "Absolute Advantage Theory" as the basis and basis, in his book "Political Economics and Taxation Principles" He also put forward a "comparative advantage theory" that has universal guiding significance and universal applicability. In this theory, the core idea expressed by David Ricardo is that the difference in comparative cost is the reason why the industries of various countries have an advantage in international trade competition. The important basic conditions produced.

At the beginning of the 20th century, the Swedish economist Heckscher and his student Ohlin proposed a new international trade model (1919), which provided a very in-depth explanation of the comparative advantage theory, and Put forward the "resource endowment theory" which has a far-reaching impact on later. The theory clarifies in detail that all relatively extraordinary production conditions are not all formed by acquired conditions. Many times come from the relevant "natural" natural resources or natural resource endowments of various countries or regions, which can also be said to be "naturally advantageous" production. condition. Natural resource endowments and acquired favorable conditions will differ to a large extent due to differences in countries or regions, which provides a very necessary foundation and foundation for the creation of international division of labor.

Since the first half of the 20th century, almost every corner of the world has been in war. Almost all industries have been in chaos, almost all work has been stagnant, and almost everything has been in the service of war. It is difficult to talk about specific issues such as competitiveness, industrial competitiveness or international competition. At the same time, the pace of many theoretical

discussions and inquiries, including economics and law, has also begun to slow down or even completely stalled. It was not until the middle and late twentieth century that it gradually entered a period of stable development. Various industries gradually returned to the right track and developed at a high speed, and many new industries appeared, and the industrial competition environment gradually formed. In the early 1990s, the father of competitive strategy, Michael. E. Porter of Harvard University in the United States made breakthrough important results in the in-depth research and exploration of industrial competitiveness, that is, the research on industrial competitiveness. The substantive goal is to answer how the country's economic, social, political and legal environment has played a role in the development of the industry. In his book “National Competitive Advantage”, he put forward the famous “National Competitive Advantage Theory”. The theory particularly emphasizes that the actual conditions of different elements, the specific needs of different subjects, the degree of support from related industries, and the actual domestic competition are all key elements that affect their competitiveness. In addition, government elements and opportunities from various parties are also two very important elements, and the world-famous “diamond model” has been constructed based on these elements and conditions. The theory of national competitive advantage can provide a framework for the gradual exploration and in-depth exploration of the international competitiveness of the biological products industry, which is almost completely different from the traditional theoretical analysis and problem analysis framework. It is more and more embodied as the universally recognized, any and encouraged One of the key theoretical studies on the international competitiveness of the industry.

After Michael Porter proposed the “Diamond Model” in 1993, British scholar Dunning made a profound transformation of trade and production from the perspective of individual countries. He believes that in an open international market, the technology and capital of multinational corporations have a very large influence on the changes in the world’s industrial structure, and in addition to Porter’s government factors and various opportunity factors, the “ “Business activities” are considered on the same status as them. After this, the two innovative models of Porter and Dunning formed the stylized “Porter-Dunning model” widely used in industrial competition research.

3. Related Domestic Documents

Scholars such as Jin Sicen (2007) made a more comprehensive comparison between China and developed countries or regions such as Europe and the United States based on the SCP framework in the theory of industrial organization. The purpose is to find out the shortcomings in the comparison, and then help China The development of the biological products industry proposed suitable countermeasures.

Zhou Minliang (2011) believes that promoting the development of strategic emerging industries such as the biological products industry is an important part of the central government’s response to the national financial crisis to promote the sustainable development of China’s economy, and to promote its full and rapid development, which will accelerate the optimization and improvement of the overall economic structure. The level of the overall economic structure is of great significance. Therefore, countries all over the world are focusing on accelerating the development of the biological products industry. Many countries regard accelerating the development of the biological products industry as the core content of seizing the commanding heights of strategic competition. Although China's biological products industry has achieved considerable development, there are still some shortcomings. Seize favorable opportunities, make better use of policy resources, strengthen cooperation between industry, academia, and research, promote technological innovation, create a better internal and external environment, and promote China's biological products industry to become bigger and stronger.

Wang Jiancong (2011) believes that the biological product industry has gradually become a high-growth and strategic field that has attracted special attention to various countries or regions following the emergence of the information industry. Since the biological products industry is a system with its own characteristics, development laws and internal operating mechanisms, it is

difficult to clearly explain in many cases just using general industrial development laws. A full understanding of its development laws and policy characteristics will help China to give play to its late-comer advantages, thereby enabling the biological products industry to achieve efficient and healthy development. From the perspective of industrial economy, the author comprehensively explained the meaning and characteristics of the biological products industry, the structure of the value chain, internal interactions, technological innovation, and related industrial policies.

Scholars such as Chen Wenjun, Peng Youwei and He Zhengchu (2018) used cluster analysis and spatial autocorrelation to comprehensively and thoroughly consider the specific comprehensive evaluation of the development level of China's biological products industry and the objective spatial differences. The results of the analysis are obvious It shows that there are big differences in the development level of China's biological products industry, and the distribution is also extremely unbalanced. For example, the development level of the biological products industry in the eastern coastal provinces is relatively high, and the development level in the central provinces is relatively average. In the western provinces, most of the development levels are relatively backward. In other words, the development level of China's biological products industry shows a relatively obvious positive spatial correlation, and also shows a clear phenomenon of agglomeration of the same kind.

Regarding industrial competitiveness, scholar Jin Bei (1997) believes that the status of each country's different industries in the world economic system is affected by various factors. Based on the understanding of the international division of labor, the comparative advantage of the industry has a decisive position among them; and the in-depth understanding based on the level of industrial competition, the competitive advantage of the industry also has a decisive position. However, the reality is that the combined effect of comparative advantage and competitive advantage determines the international status and future direction of each country and industry. Immediately afterwards, Jin Pei further proposed that for the analysis and research of special industrial competitiveness, comparative advantage and competitive advantage are inseparable and closely related. Therefore, it is not necessary to accurately calculate the difference between the two. What is the size of industry influence? In addition, he also conducted a relatively sufficient evaluation and research on the difference and connection between the two. Specifically, he believes that the difference between comparative advantage and competitive advantage is mainly manifested in the following: the former, to a greater extent, illustrates the relationship between various industries (or products) between various countries, and it pays more attention to the relationship between various countries. The potential for the development of related industries; but the latter involves to a greater extent the links between the same industries in each country, and it pays more attention to the current state of the development of the interconnected industries in each country. In a nutshell, comparative advantage emphasizes a country's special and unique resource endowments, while competitive advantage is more inclined to focus on behaviors such as corporate strategies.

Two scholars, Gong Xinglong and Wang Renzeng (2002), conducted a detailed and in-depth study on the objective status quo, evolution process and overall strategy of China's industrial international competitiveness. The two scholars believe that the following factors are indispensable for China's international competitiveness: the actual domestic economic development, the degree of participation in deep internationalization, the level of comprehensive government management, whether the financial system is complete, whether the infrastructure is complete, What is the management level of the enterprise, the underdevelopment of science and technology, and the quality of the entire nation, etc.

Zhou Xing and Fu Ying (2000) two scholars conducted research on the construction of an evaluation index system for the international competitiveness of products. They believe that the international competitiveness of industries is closely related to the four indicators, which are the quality indicators of domestic industries, indicators of the status quo and development trend of the industrial structure, indicators of environmental institutional factors in industrial development, and indicators of industrial internationalization and capabilities. Among them, the fourth index mentioned the international market ratio (MS), the explicit comparative advantage index (RCA) and the competitive advantage index (TC) as indicators for evaluating industrial trade advantages.

Researcher Zhang Jinchang (2002) found in a long-term study that import and export trade and international competitiveness show obvious homology. Because of this, he proposed that the analysis of import and export trade data can be used as a comprehensive evaluation of international The basic and important indicator of competitiveness. Therefore, in order to achieve this effect, Researcher Zhang Jinchang established a system that can evaluate the international competitiveness of the industry based on import and export data. This system for evaluating the international competitiveness of the industry based on import and export data contains three indispensable parts: The first part is an indicator that can fully show the market share, which mainly includes market penetration rate and import share. Several indicators such as ratio indicators, export contribution rate, and export growth advantage index; the second part is indicators that can show trade (net exports), which mainly include trade competitiveness index, relative competitiveness index, and trade division index. An important indicator; the third part is an indicator that can show the proportion of exports, which mainly includes three important indicators: the revealed comparative advantage index, the revealed competitive advantage index, and the net export revealed comparative advantage index. At the same time, Zhang Jinchang further explained that the above indicators can not only be used independently, but also can be used comprehensively, but each indicator itself has some limitations, so it should be used in the process of specific application. note.

Scholar Guo Jingfu (2004) used the systematic diamond model to further refine and classify the factors forming industrial competitiveness. He pointed out that its evaluation system is actually constructed based on many factors. They are production , Market, technology, capital, system and other six aspects of competitiveness. At the same time, Guo Jingfu also pointed out that competition, as an inevitable product in the development of market economy, plays a very crucial role in promoting the healthy and rapid development of the economy and society. Generally speaking, the essence of competition mainly reflects the struggle between the viability and development capabilities of the parties related to the interests. It also reflects the struggle between the various stakeholders in the productivity. Regional competitors are mainly between local governments. The wrestling is mainly reflected in the wrestling between regional resource acquisition capabilities and the industrial development environment, and is mainly reflected in the wrestling of industrial development capabilities.

Scholar Sun Gaojie (2008) put forward a point very close to and very similar to researcher Zhang Jinchang in a literature review of the international competitiveness of industries, that is, the international competitiveness index system and import and export data show a positive correlation. Therefore, , Can deeply reflect the strength of international competitiveness through import and export indicators. It also divides this indicator system into three parts, including the market share indicator (MS), trade surplus indicator (TC), and export share indicator (RCA).

4. Literature Review

By combing the research results of domestic and foreign scholars, it can be said that whether it is the development of the research industry or the biological products industry and its competitiveness, the research of foreign scholars is early and extensive. However, domestic research on related issues has also begun in recent years. However, whether it is foreign or domestic, judging from the existing literature, the analysis of factors affecting industrial competitiveness and the formation and construction of industrial competitiveness are not sufficient. There are mainly the following gaps: (1) Lack of the biological products industry Comprehensive evaluation and comparative analysis of competitiveness. Existing documents are usually limited to a certain country or region, which is far from enough for analyzing the competitiveness of the biological products industry; (2) For countries in the biological products industry The horizontal is relatively small, and from the existing literature, most studies have been seriously inconsistent with the current situation for too long. The longitudinal analysis of a country’s biological products industry is not comprehensive enough; (3) From the perspective of quantitative research, although scholars have constructed different evaluation index systems, the purpose is to measure the competitiveness of the biological products industry. As well as the competitiveness of enterprises, domestic scholars have not enough

empirical research on the formation and construction of competitiveness. Although there are some empirical analysis literatures, the author thinks that it may be difficult to collect data and result in fewer samples, because of the analysis obtained The conclusion is also difficult to truly reflect the status quo.

References

[1] Zvi Griliches and I. Cockburn. Generics and New Goods in Pharmaceutical Price Indexes. Harvard Institute of Economic Research, USA,2001:436-440.

[2] Jorg C. Mahlich and Tonmads Roediger-Schluga. The Changing Nature of Pharmaceutical R&D-Opportunities for Asia. ISIE 2001, Pusan, South Korea, 2003: 23-36.

[3] Mooney K.George. How to Manage for International Competitiveness. International Business Press, New York, 1992: 401~406.

[4] Daron Acemoglu and Joshua Linn. Market Size in Innovation Theory and Evidence from the Pharmaceutical Industry. UCLA Department of Economics, USA, 2004: 127-263.

[5] John A.Vernon. The Relationship between Price Regulation and Pharmaceutical Profit Margins. Applied Economics Letters, 2002: 255~258.

[6] Vankeirsbilck, Export Strategy Building up Technology-Intensive orielltation. 1996 Industry Applications Conference, 1996: 2064-2070.

[7] Vervaet, Chris. Price Regulation and Competition in Pharmaceutical Market. Econometric Society, Japan, 2004: 13-17.

[8] Abraham, John. Incentives and Pharmaceutical Reimbursement Reforms. The Free Press, New York, 1985, 1: 770-775.

[9] Malhotra P. Development of India’s Pharmaceutical Industry. Impact of TRIPS in India. Palgrave Macmillan UK, 2010.

[10] Subramanian R, Toney JH, Jayachandran C. The Evolution of Research and Development in the Pharmaceutical Industry: Toward the Open Innovation Model-Can Pharma Reinvent Itself?. International Journal of Business Innovation & Research, 2011(01):63- 74.

[11] Horner R. The State, Patents and the Development of India's Pharmaceutical Industry. Dissertations & Theses -Gradworks, 2013, 12(05):920-928.

[12] Adam Smith. The Wealth of Nations. Translated by Wenxi and Mou Shanji, Wuhan: Wuhan University Press, 2010.

[13] Bertol Olin. Interregional Trade and International Trade. Translated by Lu Yuduo. Beijing: China Publishing House, 2008.

[14] Michael Porter. National competitive advantage. Li Mingxuan, translated by Qiu Rumei. Beijing: China Publishing House, 2002.

[15] John H. Dunning, Sarianna M. Lundan. The Geographical Sources of Competitiveness of Multinational Enterprises: An Econometric Analysis. International Business Review, 1993(07):115-133.

[16] Jin Sicen, Hu Yuanjia, Wang Yitao. Comparative analysis of the pharmaceutical industry between China and Europe and the United States: structure, behavior and performance. Chinese Journal of Pharmaceuticals, 2007(07):545-550.

[17] Zhou Minliang. Promote the strategic adjustment of economic structure by accelerating the development of the biopharmaceutical industry. Learning and Practice, 2011(02):19-30.

[18] Wang Jiancong. Research on the Development Law and Policy of Biopharmaceutical Industry.

Central China Normal University, 2011.

[19] Chen Wenjun, Peng Youwei, He Zhengchu. Comprehensive evaluation and spatial difference analysis of the development level of China's biopharmaceutical industry. Finance Theory and Practice, 2018(03):147-154.

[20] Jin Pei. International Competitiveness of China's Industry--Theory, Method and Empirical Research. Beijing Economic Management Press, 1997.

[21] Gong Xinglong, Wang Renzeng. The status quo, evolution and development strategy of China's international competitiveness. Journal of Hebei University, 2002(01):43-48.

[22] Zhou Xing, Fu Ying. Research on the Evaluation Index System of Industrial International Competitiveness. Scientific Research Management, 2000(03):29-34+22.

[23] Zhang Jinchang. Research on the Method of Evaluating International Competitiveness with Export Data. Economic Management, 2001(20):17-25.

[24] Guo Jingfu. Research on Industrial Competitiveness. Economic Forum, 2004(14) 32-33.

[25] Sun Gaojie. A Review of the Research on the International Competitiveness of Industry. Reform and Strategy, 2008(08):161-163.