

Research Report on Market Value and Industrialization Management of Biotechnology

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Abstract: This research is mainly based on the in-depth understanding of the macro global competitive environment of the rapid development of biotechnology-related industries in my country and the in-depth analysis of the development status of related industries at home and abroad. This research also takes Zhejiang Tsinghua Yangtze River Delta Research Institute-Gress Natural Products and Health Research Center as a sample of specific research results and uses advanced research methods such as Internet reference method, empirical comprehensive research method, group method, and case comprehensive analysis method to systematically study the breakthrough of the industrialization model of the development of Chinese biotechnology industry and realize the research on the market value and industrialization management of biotechnology.

Keywords: Biotechnology, Market, Management, Industrialization.

1. Introduction

Biotechnology and health care industry is not only the commanding height of important economic strategic development in countries around the world, but also one of the emerging industries with the fiercest competition in the world. 76% of the biotechnology core industry companies in all countries in the world are in Europe and the United States. The annual sales of European and American companies account for 93% of the annual sales of biotechnology industries in all countries in the world, while the sales of companies in other regions such as the Asia-Pacific region account for only 3%. American companies have always been important technology leaders supporting all the core biotechnology industries in the world. The core biotechnology products produced and developed by American companies and their product sales in the international export market account for more than 70% of the world. [1] In order to continuously accelerate the healthy development of biotechnology-related industries, our country has always listed the development of biotechnology industry as a national major industrial technology innovation plan. However, due to the lack of national independent R&D intellectual property rights, the low level of industrial innovation capability, insufficient investment and single technical channels, lack of industrialized technical talent resources, and the disconnection between R&D and technology industrialization development, Chinese biotechnology industry is still in its infancy, and the basic research of industrial development is still far from that of western developed countries, especially the realization of industrialization.[2] However, because it is still at an immature stage, it has more market potential and industrialization management has become particularly important.

To study the market value and industrialization management of biotechnology, we need to start from three dimensions: technology, system and management. By systematically studying the characteristics of the industrialization mode of the development of China's biotechnology industry, we can find breakthroughs, upgrade the industrialization mode, guide enterprises to use

technology to build barriers, open up differentiated markets, form a complete supply chain, and realize the operation of a new industrialization mode.

2. Research Background, Purpose and Significance

2.1. Research background

The development of the biotechnology food industry is based on absorbing the theoretical achievements of modern advanced life science and technology and also combined with professional theories and scientific and technological means such as electronic informatics, system design science, engineering technology control and so on. The development of biotechnology food industry develops and manufactures various products by studying the basic components, structures, functions, interactions and mechanisms of organisms and their eukaryotic cells, steroidal cells and other molecules and conducting scientific research and applications. The biotechnology food industry transforms various animals, plants, microorganisms, etc. to make its products have the highest quality and characteristics expected by the owner and provide high-quality goods and public services for the general public.[3]

With the development of technologies and methods such as genomics, proteomics, and metabolomics, biologists have entered a new era of transforming and creating species from the era of understanding and utilizing organisms. According to the different industrial subdivision application fields and different industrial structure characteristics of the main biotechnology industry subdivision applications in my country at present, The application subdivision of the biotechnology industry is mainly composed of six major industrial subdivision application fields developed together.[4] They are applied biomedicine, biotechnology applied agriculture, biotechnology applied manufacturing, biotechnology applied energy, bioenvironmental protection and other related biotechnology application services. Its industrial development has a strong driving effect on the development of the national economy. At present, on a global scale, the scale of the biotechnology industry is expanding rapidly, and the effect of industrial agglomeration is

increasing. In 2018, the sales revenue of listed biotech companies in the world's major biotech developed regions reached US\$143 billion, according to MarketLine Consulting's annual industry report. Compared with 2017, the sales revenue increased by 8%, and the net profit was US\$8.5 billion. In terms of market value, the total market value of listed biotech companies in major biotech regions has reached US\$954 billion in 2019, an increase of 20% over 2018. Among them, the biopharmaceutical industry is the most important segmented industry, with an output value of US\$420 billion in 2019, accounting for 44% of the total output value of the global biotechnology industry.

In China, the State Council's latest "Bio-Industry Development Plan" clearly stated that by 2020, the bio-tech high-tech industry will be accelerated and built into a pillar industry of the national economy. This indicates that the

strategic position of the biotechnology industry in China's national economy has been further enhanced. Driven by favorable policies, from 2010 to 2019, the market size of my country's molecular biotechnology equipment industry doubled from 315.6 billion yuan to 1,271.6 billion yuan in 2019, an increase of 4.03 times (Figure 1). By 2020, the market size of China's biopharmaceutical industry has been 3.57 trillion yuan. According to relevant plans, it is estimated that by this year (ie, 2022), the scale of China's biopharmaceutical industry is expected to exceed 4 trillion yuan, greatly exceeding the growth rate of the world's biotechnology developed regions. The key biotechnology industries in Shanghai, Beijing, Shenzhen and Guangzhou have begun to take shape, producing a certain driving effect of bio-industry integration and agglomeration.[5]

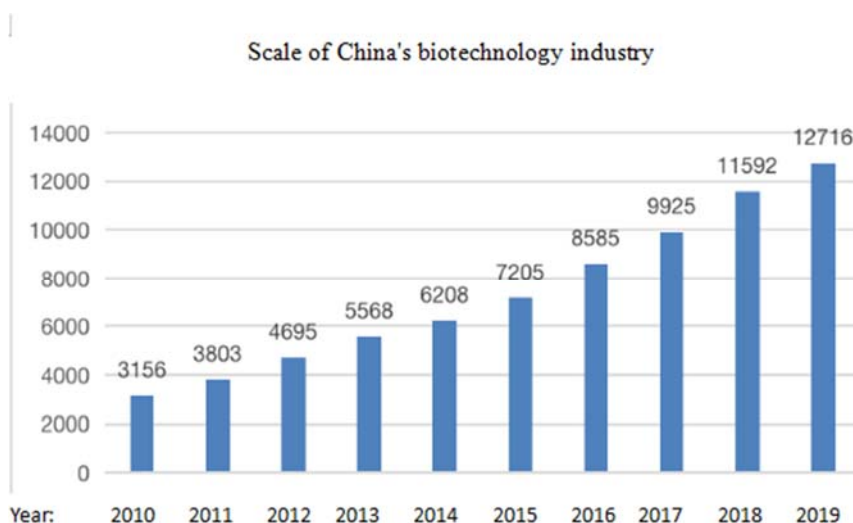


Figure 1. The scale of my country's biotechnology industry

However, there are still many restrictive factors in the development process of China's biotechnology industry. First, at present, Chinese biotech enterprises have very low R&D investment and insufficient innovation capability. Second, China's existing institutional structure lacks a sound legal environment, financial environment, tax policy, technological

development support system, social network, knowledge network and enterprise system, etc. Third, the level of Chinese biotech enterprises in strategic management, risk management, technology management and production management needs to be improved (Figure 2). [5]

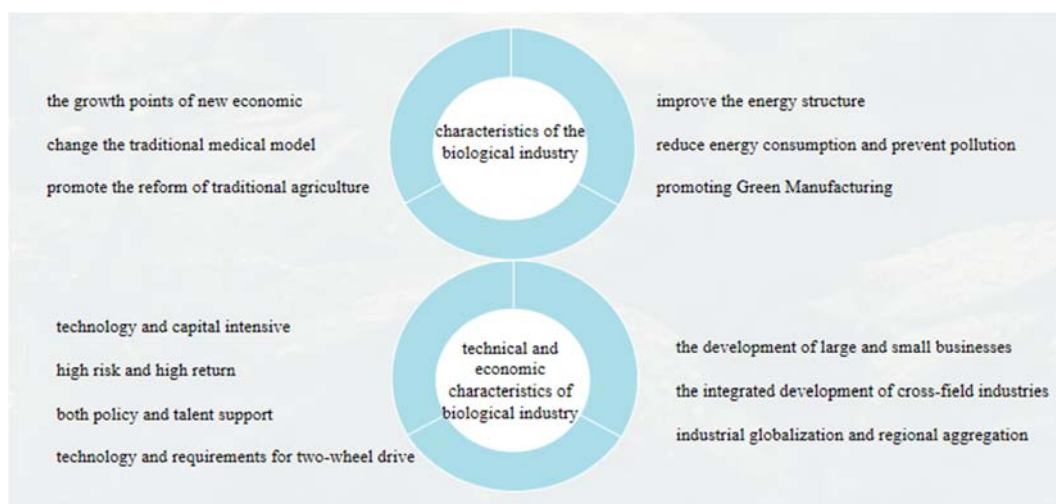


Figure 2. Value characteristics and technical and economic characteristics of the biotechnology industry

2.2. Research purpose and significance

The development of the biotechnology industry follows a

special path of technological progress and the law of industrial development. With the rapid development of the

biotechnology industry today, this study will analyze the promotion or restriction effects of various factors on the development of the industry from three dimensions: technology, system and management.

Vigorously developing modern biotechnology is one of the keys for China to continuously shorten the gap with developed countries and achieve leapfrog development of economy and technology.[6] Therefore, it is urgent for academia to strengthen research on the development of the biotechnology industry in order to promote the rapid and sustainable development of the biotechnology industry. Judging from the existing limited research results, most of them are still limited to general international experience for reference, or countermeasure research on the status quo and problems of industrial development from the overall level of the national economy. Aiming at the relevant characteristics of modern biotechnology, it is of great theoretical significance to deeply study the development system and policies of China's biotechnology industry from the perspective of "technology-system-management", combined with theories of macroeconomics, industrial economics and enterprise management.

It is of great practical significance to systematically study all aspects of the development of the biotechnology industry.

First, it can deepen the understanding of the development status of China's biotechnology industry.

Status quo of biotechnology industry development and innovation: (1) Most biotechnology innovations are still limited to general international experience, lack of original technological innovations, too few independent research and development intellectual property rights, and relatively low industrialized innovation capabilities. (2) In terms of system, the development of my country's biotechnology industry has problems such as lack of system or imperfection, imperfect coordination and overall planning mechanism, serious lack of investment and single channel and so on. (3) In terms of operation and management of large-scale enterprises, aiming at the operation and management of large-scale industrial biotechnology research enterprises in my country, the cultivation of professional quality of scientific and technological development talents, the atmosphere of academic research and exchange, the protection of patent and intellectual property rights, and participation in national key scientific research groups Academic research and other aspects also need to focus on research to be continuously strengthened. In particular, one of the biggest shortcomings is that there is a serious shortage of management and technical personnel in the process of management technology development and industrialization, and the development of R&D and management technology combined with the development of the industrialization system is seriously out of line. In addition, a large number of biotechnology professionals in my country currently focus on basic research on biological theory, and there is a relative lack of industrialization technical talents. In the current development of my country's clinical biotechnology industry, some laboratory biological scientific research results are often difficult to achieve industrialization, or the products have no significant economic application value due to the high cost of the industrialization process.[7]

Second, it can enhance awareness of the effectiveness of China's biotech industry policy.

At the current stage of the development of China's biotechnology industry, the state's policy support and

guidance are crucial to the research and development and industrialization of biotechnology. The "Biotechnology Development Plan" proposes the overall deployment and action guidance for the development of the biotechnology industry. The "Plan" clarifies the guiding principles of overall deployment, step-by-step implementation, highlighting innovation, supporting industries, integrating points and areas, and leapfrogging development.[5] The main customer gathering points of key biotechnology industries in various provinces and cities are regions, such as Shanghai, Jiangsu, Guangdong and other provinces and cities, all of which have issued local development plans and policies for the biotechnology industry.[8] How effective is the policy? Can the expected development goals be achieved? These need to be verified in practice.

Third, it can improve the viability and development ability of biotechnology enterprises. In the past decade, there has been a boom in biotechnology entrepreneurship in China, and a large number of biotechnology companies have been established during this period. The new enterprise risk management system of biotechnology has technical particularity. Therefore, higher technical requirements are put forward in the fields of enterprise risk management, strategic investment management, production process management and enterprise technical process management.

As the global COVID-19 pandemic continues to spread, intense government, media and public attention to COVID-19 has focused on science and medicine. The state of global biotech in the context of the Covid-19 crisis: During the period from January 2020 to January 2021, the average share price of biotech in Europe and the United States grew more than twice as fast as the S&P 500, and the average share price of biotech in China grew 6 times faster than that of the S&P 500. The average share price has more than doubled in one year.[9] Why has the biotech industry remained so resilient during the worst economic crisis in decades? Innovation is the main reason. Original technology innovation, management system innovation, etc. are the key points for my country's biotechnology enterprises to improve their ability to survive and develop.

This research will help to deepen the understanding of the macro environment of enterprise operation and the market, and help enterprise management decision-making, so as to improve the survival ability and development ability of the enterprise.

Fourth, it can promote the healthy and rapid development of the biotechnology industry.

The biotechnology emerging industry innovation and development project is the most active and far-reaching emerging development industry in my country's scientific and technological innovation in the 21st century. This project has important strategic guiding significance to build a "healthy China" modern and powerful agriculture.[10]

In recent years, although my country's biotechnology industry has developed rapidly, there are still obvious gaps and deficiencies compared with developed countries: (1) talent training is uneven, and biotechnology entrepreneurs are insufficient; (2) there is a lack of independent intellectual property rights and no market competitiveness; (3) lack of funds and limited research and development capabilities; (4) homogenization is relatively serious, which is not conducive to the development of the entire industry chain.[11] Therefore, it is necessary to effectively solve the problem by strengthening guidance in the following key aspects: (1)

Actively guide social resources such as technology, talents, and capital of enterprises to gather in key biology material industries, promote independent innovation and application industrialization of biotechnology in enterprises and accelerate the development of technological scale, agglomeration integration and industrial internationalization in the biology material industry;[12] (2) Accelerate the establishment of a biotechnology innovation talent system for key industries such as maintaining the interests of the enterprise, taking the market demand as the policy orientation and combining production, education and research applications. Create a high-quality professional talent team. Enhance the enterprise's independent R&D and innovation capabilities. Master a group of major new biotechnology, products and technical standards with national independent research and development intellectual property rights. (3) Vigorously cultivate a number of large and medium-sized biotechnology enterprises that are wholly owned by multinational companies and a large number of scientific and technological innovation-oriented small and medium-sized biotechnology enterprises with national independent R&D intellectual property rights. Form a number of new biotechnology industry bases with high bio-industry technology concentration, strong core technology competitiveness, specialized technical division of labor and distinctive features; (4) Continuously strengthen and improve the protection of biotechnology-related patent property rights and related species, the comprehensive development of germplasm ecological resources, and the utilization of management levels to ensure national biology security.[13]

This study will systematically analyze and study various industrialization management modes in the rapid development of my country's biotechnology-related industries through three different dimensions of enterprise technology, system and enterprise management. This provides new reference ideas for my country's

biotechnology-related industries to continue to accelerate the healthy development and narrow the gap with the industrialization of biotechnology in developed countries. In addition, the research results of this subject have certain application guidance and research significance for other types of high-tech emerging industries that have similar development characteristics to my country's biotechnology emerging industries in the process of accelerating the development of national strategic emerging industries of science and technology.

3. Research Content

3.1. Research ideas and structure

The key object of this research is to realize the core value of biotechnology market segment and its segmented industrialization management. It includes six main sub-pillar industries, including modern biomedical subdivision industry, biotechnology agricultural industry, biotechnology manufacturing equipment industry, biotechnology energy manufacturing industry, modern biological environmental protection manufacturing industry, and biotechnology service manufacturing industry. The research of this subject mainly focuses on the major particularities of the rapid development of the current biotechnology subdivision industry, and uses the three-dimensional dimension of "technology + system + management" to analyze and research the main factor system currently affecting the rapid development of China's biotechnology subdivision industry. Besides, no matter in the current global economic scope or in China, the biomedical sub-industry may be the most important industrial composition affecting the biotechnology sub-industry.[14] Therefore, the empirical research of this study focuses more on the data of the biopharmaceutical industry. Based on the above research content, the research structure of this paper is shown in Figure 3.

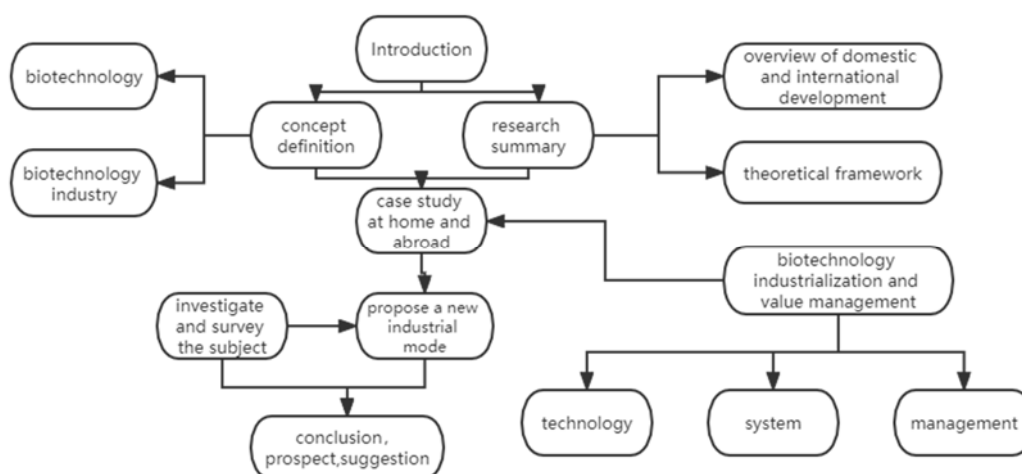


Figure 3. The structure of this research

3.2. Research methods

This research will make full use of various research methods, such as comprehensive data reference method, empirical data research method, group method and case data analysis method, and analyze and summarize the research progress on the development of biotechnology industry at home and abroad through a large number of literature reading.

Finally, these are taken as the starting point of theoretical analysis in this paper. On this basis, the characteristics and development laws of technology-related industries in modern applied biotechnology are summarized and analyzed. Through the three-dimensional dimension of "technology + system + management", with comprehensive case analysis and related cases as a comparison, this paper uses basic theories such as enterprise performance evaluation

mechanism theory, industrial technology innovation development theory and intellectual property protection theory and adopts the subject research theory method organically combined with multi-level case analysis method, positive case analysis and comprehensive analysis of international cases to deeply analyze and study the technology development law system and industrial policy of Chinese modern biotechnology-related industries. It mainly involves understanding the current status of modern biotechnology-related industrial technology development trends, industrial structure characteristics, industrial technology organizational structure, industrial technology clusters, and technology enterprise management and other aspects, and through the research on the above topics, this paper will propose relevant policy research recommendations.

3.3. Research conditions and case analysis

In the development process of the industrialization of biotechnology products in my country, the demanders and technology suppliers of biotechnology products are mainly based on the comprehensive consideration of many economic factors such as the scale of investment projects of enterprises, profit distribution, prevention of hidden risks and the development of subsequent innovative products of enterprises. Different industrialized business models will be selected separately. Based on the consideration of the comprehensive economic factor theory of enterprises, the selection of various industrialized business modes led by technological entrepreneurs and combined with production, education and research is an important and dominant business mode for promoting the industrialization of biotechnology products in our country.[15]

This research plan takes the Zhejiang Tsinghua Yangtze River Delta Research Institute-Grace Natural Products and Health Research Center as a sample to demonstrate the feasibility of the "one-stop" new industrialization mode which is market-oriented, led by enterprises, based on scientific research institutions and colleges, and realizes that enterprises start to intervene from basic research.

Institutions and enterprises have their own strengths, but limited by the mechanism and system, the industrialization of the traditional industry-university-research model is usually limited to cooperation in the productization stage, and often cannot achieve risk sharing. If enterprises do not deeply participate in basic research, the traditional industrialization model cannot cooperate deeply. Let's look at the case and analyze it.

Doctor a, a senior technical researcher and general manager of a national pharmaceutical science research institute, successfully invented a new topical drug that can currently be used to treat various types of skin diseases, and successfully obtained a number of national invention patents or use rights authorization. Introduced by someone, doctor b, the senior boss and general manager of a large technology company specializing in the production of a topical drug for the early treatment of skin diseases is very interested in the startup company's new drug. After the two doctors met for the first time, the chat was more speculative. B first took a little test sample for trial use, took it back and then found six people to try it out together. Among them, only two people repeatedly reported that there was no obvious side effect after one use, and four people repeatedly reported that the effect after repeated use was not obvious. B still had a strong interest in this large new medical drug. So he took the initiative to

negotiate and negotiate with the local citizen representative to communicate the quantity and sales price of the land for the new medical drug. At the beginning of the negotiation, A's asking price was about 20 million yuan a day. B didn't dare to discuss a lot of negotiation and counter-offer with him, because it was too different from the price in his own personal use psychology and demand. So he had to give up through negotiation and counter-offer. He made a highly analyzable scientific evaluation of the research results of the invention patent used in the new drug of the drug and believed that the new drug invention patent was only a preliminary or research idea, and it was impossible and needed to be improved. Even if it is a new drug with the lowest materials and the best effect at present, the optimal dosage ratio of each main and auxiliary material, production process, consistency of raw material color of the product, epithelium and drug absorption of transparent film are still worth us to spend a lot of money, time, energy and spirit to study or explore. In addition, in the scientific experiments involving pharmacological materials including biological efficacy, toxicity mechanism and drug anti-pathology, etc., A only did about 5% of the total workload of the tests necessary for that new drug. B first calculated his own financial accounts. A drug clinical research result that is still in the preliminary preparation stage of the drug clinical medicine laboratory needs to go through several new preclinical qualitative tests until the end of this year to obtain the latest national drug quality certification and officially approved for production and marketing. During this period, it is estimated that at least 6-8 years of additional clinical research and development time will be spent. The large amount of human cost input during the period is obviously already huge. The 20 million yuan housing land use transfer fee and the land price are too high for them to feel completely acceptable. But he said that if the relevant patent for that matter has passed the relevant professional technical laboratory and technical research in China and obtained the best quality, mix ratio, relevant technical data of related products and main and auxiliary materials, the price of this Chinese patented product will definitely be low enough for him to accept it. As for medicine, A believes that the patients with advanced hepatitis B disease who have no obvious therapeutic effect of the four medicines may not continue to use the medicine according to his requirements in this use of the medicine. Moreover, the price decision of the drug may only be negotiated by the two parties in the future. In this way, A expressed that both parties would be willing to continue to find him for business communication with Pharmaceutical Company B in the future. From this case, we can see that if an enterprise wants to successfully implement the efficient transformation of scientific and technological achievements of a new drug enterprise, it must be profitable. And this "benefit" must require the enterprise to have a very large enough international market and attractiveness. Roughly speaking, a pharmaceutical company must be willing to take huge risks of expected technology use, actively increase investment and dare to actively increase investment. For B, he has been working on new drugs for many years, but he has stopped because of his accurate judgment. He believes that whether the new biosynthetic drug can obtain a national patent is only an idea in the preliminary design of the product. In the application process of developing non-biosynthetic pharmaceutical new drugs, it is expected that the actual technology use investment is relatively large and the expected technology use cost risk is very high. There is a serious gap

and obvious deviation between its actual market application value and the actual market price of the product of development goal A. Let's briefly analyze the main reasons as follows:

The new patented drug and its related patents are still the results of early clinical research. Good related patents and their efficacy control mechanisms must be the source and location of the strong scientific vitality of this type of new drug. Although the patented curative effect control mechanism of the drug and its research results are feasible from the perspective of scientific theory, its actual clinical effect is not ideal. According to the situation described in this case, this study speculates that the new patented drug and its related patents are still immature.

(2) The investment is huge. To transform the early research results of a national new drug, the process is very complicated and involves many links, including the preliminary follow-up research test, product development, process technology development, pharmacological and chemical efficacy and biotoxicology and pathochemical tests of a new drug's early results research. It takes at least 6-8 years of investment time to apply for national drug certification, product development and listing, marketing and promotion, etc.[16] and the risk of investing a lot of money is huge. These financial accounts are very clear for the needs of enterprises and society. If they can be calculated, they need to invest. If they can't calculate, they have to choose to give up. Obviously, b calculated the account of this enterprise and think that the risk was too great and it was not worth it.

(3) The offer price for the transformation of scientific and technological achievements should not be a one-shot deal. A better way of making an offer is: on the basis of full business communication, in accordance with the principle of mutual benefit and win-win cooperation, according to the maturity of the scientific and technological achievements used in the transformation of new drugs, the main technological innovation progress and progress transformation of the main product development, as well as the expected sales revenue and income of the self-developed products for the transformation of new drugs, the two parties proposed a milestone price conversion standard for scientific and technological achievements and a charging standard for technical commission results using sales revenue. Both parties agree that it is not the sharing of their own expected economic benefits that bears the risk of expected economic benefits.

The overall value transformation of an important scientific and technological achievement by the enterprise will make a comprehensive price evaluation and value judgment, including the value of enterprise scientific research, technological innovation value, market application value, the maturity of a scientific and technological achievement and the value investment that takes time to transform into value. From this point of view, enterprises play an important role in the process of promoting the value transformation of scientific and technological achievements, that is, the main body of strategic decision-making activities, the main body of investment utilization and the main body of project implementation activities.

Combining the above case, this study speculates that some enterprises have not invested in the implementation of the huge transformation of scientific and technological achievements, probably because the huge transformation of scientific and technological achievements of enterprises does

not have huge economic benefits. This will inevitably require the transformation of scientific and technological achievements of enterprises to have huge potential economic benefits. Mountains have shapes and waters are impermanent. The overall pattern of market competition is changing rapidly, and the overall advantages of market competition currently possessed by enterprises may soon be wiped out due to the re-emergence of technological disruptors. Enterprises that actively support early-stage enterprise scientific research can directly obtain the core technology of the enterprise and even directly obtain the core market competitiveness of the enterprise. This may be an important prerequisite for supporting enterprises to actively implement the efficient transformation of early scientific and technological achievements.

With such a "one-stop" industrialization model, we can realize the development and protection of the company's original technology. Research and development and industrialization management are carried out smoothly, compactly and uninterrupted. Enterprises dominate the overall market development direction. Whether it is financing method or policy orientation, it will be more convenient in the current environment of supporting small and micro enterprises. Both efficiency and effectiveness are more worth looking forward to.

3.4. Research analysis and results

Through interviews with scientific researchers and enterprise R&D teams of Zhejiang Tsinghua Yangtze River Delta Research Institute-Grace Natural Products and Health Research Center, and comparing the actual product market performance, see the following interview records:

Interview Outline

The Purpose of the Interview

Feasibility of a "one-stop" new industrialization model in which enterprises start from basic research

Interview Method

face to face interview

Interview Subjects

The researcher and marketer from the Yangtze River Delta Research Institute of Zhejiang Tsinghua University-Grace Natural Products and Health Research Center

Interviewee's Background:

Zhang Rongqing

Doctor Degree Nanjing Agricultural University

Postdoctor State Key Laboratory of Reproductive Biology, Institute of Zoology, Chinese Academy of Sciences

Director of the Institute of Biomedicine, Tsinghua Yangtze River Delta Research Institute, Zhejiang

Interview Outline

Interview topic: R&D and "one-stop" industrialization

(1) How has the industrialization led by colleges and universities been carried out in the past cooperation?

Zhang Rongqing: In the past cooperation, there were various ways, mainly including the transfer of academic achievements, the technology development of school-enterprise cooperation, the co-construction of enterprises, the co-construction of experimental platforms and so on.

(2) What are the difficulties and problems in the industrialization process led by colleges and universities in the past cooperation?

Zhang Rongqing: The two systems are different. Colleges and universities are more concerned with the advancement of science and technology and avoid risks as much as possible.

Enterprises pursue efficiency, and require the ratio of input and output. The starting point and purpose of scientific research in colleges and universities are different from those of enterprises. In the process of cooperation, the two sides need time to adjust and get along with each other.

(3) In the past, how were the industrialized products led by colleges and universities usually formulated in terms of market direction?

Zhang Rongqing: First of all, we will choose advanced technology achievements. At the same time, we combine national and local government policies to give priority to the project direction advocated by the government and the content of the project that the people urgently need. We look for suitable companies as partners to transform the results. Of course, in the process of market issues, we listen to the feedback from the companies and finally determine the direction.

(4) If the industrialization is led by enterprises, do you think it can effectively solve the problems encountered in the previous industrialization led by colleges and universities?

Zhang Rongqing: In the past, there were not many successful cases of industrialization projects led by colleges and universities, and we often reflect on the existing problems. Now colleges and universities have also begun to change, and they are more market-oriented and actively cooperate with the requirements of enterprises to promote the industrialization of projects. If it is led by the enterprise, it can solve some previous problems, but it is also easy to generate new problems. Therefore, it is necessary to strengthen the communication and cooperation between the two parties. An overly one-sided approach may not be a particularly good one.

(5) What is your opinion on the "one-stop" new industrialization mode of the Natural Products Research Center, which is led by enterprises and funded by enterprises to invest in and participate in basic research? For example: what do you think are the advantages or disadvantages of such a mode.

Zhang Rongqing: The establishment of the Natural Products Research Center or the Joint Construction Center is a new "one-stop" mode, which makes colleges and enterprises more closely connected, mutually help to make up what the other lacks, have related interests, and share weal and woe, so as to improve the success rate of the industrialization of technological achievements.

Interview topic: market and "one-stop" industrialization

(1) Please introduce the relevant industry policies and impacts of the state and local governments

Zhang Rongqing: According to "the 14th Five-Year Plan and the Vision for 2035", "Gene and biotechnology" is one of the seven frontier fields and "biotechnology" is one of the nine strategic emerging industries. The national "fourteenth Five-year plan" for the development of Biomedical Industry emphasizes the need to expand and strengthen the biological economy. This gives us confidence to continue to specialize in our biological sciences.

(2) Please introduce the current industry background of biotechnology industry and the background of this project.

Zhang Rongqing: Biotechnology industry is a strategic emerging industry that China focuses on and vigorously develops. Our country has continuously issued a series of policies to encourage the establishment of biological resource banks, the establishment and improvement of a research and supply platform for reference materials of biological products, as well as a quality evaluation standard and technology

platform. Our country vigorously develops bio-safety assurance technology, establishes an innovation platform for biotechnology product quality and safety testing technology, and at the same time improves the sensitivity of existing testing methods, shortens testing cycles and reduces testing costs. Our country also accelerates the establishment of a modern product safety management system to ensure that drug safety, effectiveness and quality controllability can reach the international advanced level.

(3) Do you think technology is a core competitive advantage? From the perspective of the market, what kind of technological advantages can make the product have the core competitive advantage?

Zhang Rongqing: Science and technology are a primary productive force. Technology must be the core competitive advantage. In particular, our biological industry itself is a high-tech industry, and the difference in technology determines the difference in product quality. With industry-leading technical advantages, products can have core competitive advantages.

(4) What risk factors do you think exist in the industrialization of biotechnology? Is the "one-stop" industrialization model effective in improving the ability to resist risks?

Zhang Rongqing: Biological industry is one of the most promising and important industries in the 21st century. It has a broad scope and can involve all aspects of people's lives. The prospect is good, but the risk also exists. Although it has developed rapidly after more than 40 years of reform and opening up, there is still a certain gap compared with developed countries. Our basic theoretical research lags behind relatively. The talent team is not large enough. Our country lacks large company and lacks products with international competitiveness. The "one-stop" industrialization model gives full play to the scientific research advantages of colleges and universities and the market advantages of enterprises, and improves the anti-risk ability of the industrialization of biotechnology achievements.

4. Conclusion

According to the research, it should be feasible to realize a "one-stop" new industrialization mode that is market-oriented, led by enterprises and based on scientific research institutions and colleges.

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